Source book for Geography Teaching

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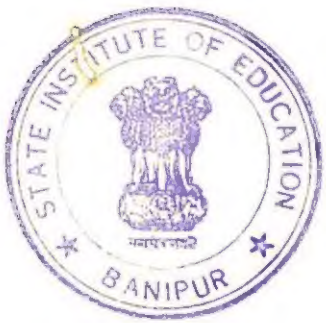
Unesco Source Book for Geography Teaching



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Source Book for Geography Teaching

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Preface

AS PART of its programme to help educators and teachers profit by experience in other countries, Unesco is devoting a series of studies to the main subjects of the school curriculum. These studies are designed for publication in the form of handbooks of suggestions rather than as specific recommendations for any particular method or syllabus.

The present book was prepared by the Commission on the Teaching of Geography of the International Geographical Union. The original manuscript was written by seven co-authors and some 450 copies of a draft edition in English and French were sent for comment to geographers and institutions throughout the world. The final version was then prepared on the basis of comments received.

A large part of the book is devoted to practical suggestions on ways and means of improving teaching methods and to the whole range of materials necessary for the effective teaching of geography at both the primary and secondary levels. The book supersedes Unesco's earlier publication *A Handbook of Suggestions on the Teaching of Geography* (1951). It is hoped that it will help to raise the standard of geography teaching and at the same time enlarge the contribution of this important school subject to better international understanding.

Grateful acknowledgement is made to Professor Benoît Brouillette, Fellow of the Royal Society of Canada, Chairman of the Commission on the Teaching of Geography of the International Geographical Union, and his colleagues in the International Geographical Union who have helped to draft the text, as well as to all those who provided comments and suggestions. Although the final work is in every sense a co-operative effort it should be clearly understood that any opinions or points of view expressed by the authors with regard to the facts stated are their own and do not necessarily reflect the views of Unesco.

Foreword

UNESCO PUBLISHES the present study in the belief that geography can make a meaningful contribution to the advancement of mutual understanding between peoples. Improvements in teaching geography for better international understanding are needed, both in those countries where the subject has long been included in curricula and in those seeking to modernize their education system as a whole. The 1950 International Geography Seminar, organized by Unesco, was a recognition of the need for these improvements, and this recognition has been reflected in related conferences and meetings sponsored by the organization since that time.

Of all school subjects, geography is perhaps the best suited to bring about this understanding, concerned as it is with civics, patriotism, and the information essential to a knowledge and appreciation of other lands and national groups. Geography can show not only how peoples have lived and are living, but also what they have contributed to the common heritage of mankind; most important of all it can demonstrate that despite political divisions, the inhabitants of the earth are becoming increasingly interdependent in their economic and cultural relations.

In asking the authors to undertake this source book, Unesco's main aim has been to aid and guide all those who teach or study in the world's schools. The task has not been easy. To begin with, it was essential to decide what function the source book was to fulfil. Two possible objectives were considered: to try and show how geography helps to improve relations between peoples, or alternatively, to give teachers practical advice on how to improve their teaching methods. The authors chose the second, being persuaded that geography cannot possibly achieve its primary objective unless it is well taught.

The work was carried out in two stages. In 1961 a preliminary version of the source book was prepared and some hundreds of copies were distributed throughout the world. These elicited a wealth of suggestions, which were taken into account in the preparation of the definitive edition. The most constructive of these suggestions came from teachers and educators with experience of geography teaching. Thus a group of Asian teachers, meeting in Bangkok at the end of March 1962, were in full agreement with the principles set out in the source book but wanted more examples taken from outside Europe. Other teachers attending a symposium in Kampala, Uganda, were more severe in their criticism. They considered the first version of the

source book too theoretical and called for an essentially practical guide-book intended for teachers who derive their training from their own experience and are almost without teaching material even in regular syllabuses. 'We teach geography', they said, 'with our "uhuru" in view, that is to say, our attainment of economic and political freedom, and to train our pupils to think for themselves and not imitate others.' In short, what they needed was a regional textbook produced by geographers well acquainted with local problems. It is to be hoped that when adapted to local conditions the Unesco source book will meet this need. In this connexion one could mention the intelligent use made of the source book by an instructor at the Ramullah Teacher Training Centre in Jordan. With only one copy of the preliminary version available, he extracted those passages of most use for his teaching staff and had them mimeographed, at the same time adapting the practical exercises to the local situation. For Chapter III, 'Working around the school', for example, his questionnaire was based on observations to be made in the Palestinian refugee village of Ramullah and the sketch map was drawn from the 1:50,000 topographic map published by the Jordan Government. For the lesson on Malaysia in the next chapter, he substituted one on Egypt from the approved Jordanian syllabus. Another change suggested by him later in the same chapter, for teaching pupils observation through pictures, was to substitute for the views of the Urubamba Valley in Peru photographs of the East Ghor Canal works on the Yarmuk, a tributary of the Jordan (photographs provided by the United States Operations Mission). Finally, to overcome the lack of photographic material, this enterprising instructor had his teachers use the colour illustrations on the calendars distributed free by the larger airlines.

Another correspondent, Mr G. C. Last, head of a teacher-training school in Ethiopia, also urges the teaching of geography along positive lines. Pupils who are starting school today, he points out, are the administrators and technicians of tomorrow, and must therefore be taught that better techniques can be used to master the intransigence of nature. The bush schools Mr Last visits are thatched huts with floors of beaten earth, without seats for the pupils or chalk-board for the teacher. The success of the teaching given depends entirely on the skill and ingenuity of the teacher, which is why it is important that his training should have a strong practical bias. Despite such unfavourable material conditions, Mr Last remains optimistic. During his tours of inspection he notes the progress that is being made and has himself set an example by producing textbooks adapted to the situation, one of which is mentioned in the African section of our bibliography.

The source book is intended for all who teach or learn geography, whether as a separate subject or as one of the aspects of social studies. Both approaches are defensible provided the specific object of the discipline is recognized and respected. It is even argued by René Clozier[1] that the incorporation of geography in social studies, as practised in a number of countries, should become universal, at least at the primary level.

The new syllabus in force in Ethiopia is a good example of the latter approach,[2] with geography and history integrated from the third to the sixth grades inclusive, on the ground that the essential object of both disciplines is the study of man in his natural environment (geography) and the record of his evolution (history). As the author points out, the foundation of the Axumite kingdom could not be explained without showing how the pioneers found, on the Tigré plateau, geographical conditions similar to those of the uplands of the Yemen whence they came, nor could the survival of a primitive form of Christianity in the heart of Islam be understood unless account were taken of the geographical situation of Ethiopia—isolated on tablelands which held out against the Muslim assaults. The choice of Addis Ababa and not Entotto as the capital of the kingdom can only have been due to the geographical advantages offered by the site of the former (central position, point of junction of land routes, abundant water supply, easily defended position). And briefly, the whole of the country's human geography—agriculture and population distribution—springs from traditional practices which the Sabaeans brought with them from across the Red Sea.

Geography can be incorporated in social studies even at the secondary school level. This is done notably in the United States, where this practice has been current since the end of the nineteenth century.[3] But it would not be right to say that, at the upper secondary level, all branches of geography are incorporated in social studies. It is true neither of physical geography nor of economic geography: the former is included in the earth sciences syllabus and the latter is studied amongst the economic sciences. This is one of those many matters that are optional and the happiness of the choice depends on circumstances. Geomorphology, for instance, was highly regarded at the beginning of the twentieth century and, together with meteorology

1. René Clozier; *The teaching of geography and adaptation of syllabi to the mental level of pupils*. Chicago, Denoyer-Gepbert, 1960, p. 15.
2. G. C. Last; *Handbook for social studies teachers in Ethiopian elementary schools*. Addis Ababa, Co-operative Education Press, 1960, p. 4.
3. William D. Pattison; 'Geography in the High School.' *Annals of the Association of American Geographers* (Washington), Vol. 52, no. 3, September 1962, pp. 280–4.

and oceanography, has been coming back into fashion since the International Geophysical Year. Economic geography has gained a following during the last forty years or so, mainly in institutions training students for careers in business and administration. World geography came in later, at the time of the second world war, in the ninth and tenth grade syllabuses and efforts are being made to incorporate it in social studies, in particular in its relation to world history. But students prefer the latter and the geography option comes far behind it in popularity. Nevertheless, serious endeavours are being made to attract more students to geography and it is planned to make it an independent subject. However, the course that holds out the best promise is that in general geography which will be available in the near future for the leaving classes—the 'senior year elective course in geography'. It has been planned with great care and will give the subject a leading place in the training of those students who plan to go on to university studies.

The Unesco source book may at first sight appear to be intended only for those teaching geography as a separate subject. Obviously, however, even when geography is incorporated in social studies, there can be no other way of teaching it if its identity is not to be completely lost.

The authors[1] of the source book are geographers trained in the school of those who have raised the subject to the honourable place it now has in the academic world. Their thanks are due to the Secretariat of Unesco which initiated the project and to all those—too numerous to mention—who responded to their request for constructive comments and criticism on the preliminary version of the book. Their special gratitude is extended to those who supplied the material for a number of examples taken from extra-European settings, for instance Professors Hisao Aono (texts on Japan), Hassan Awad (town plan of Fez, Morocco), S. P. Chatterjee (quotation on the Himalayas), John P. Cole (lesson on Peru), W. L. Dale (texts on Malaysia), Pierre Gourou (text on the Congo), G. M. Hickman (Saharan oasis and Brazilian fazenda), K. Kularatnam (lesson on Ceylon) and T. W. Luna (text on the Philippines). Finally, they express their thanks to the Council of the International Geographical Union which permitted the members of the Commission on the Teaching of Geography to hold the meetings necessary to carry their work to a conclusion.

In dedicating this book to teachers of geography in schools

1. List of authors, p. xvi.

throughout the world we entertain the hope that it will encourage and stimulate them in their often unrecognized but ever absorbing task of awakening young minds to the realities of today and tomorrow.

Benoît Brouillette
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1 Importance and educational value of geography

The highest form of education is that which is not confined to imparting knowledge but which brings our life into harmony with all existence.

Rabindranath Tagore

Importance of geography

IN THE second half of the twentieth century, everyone, however ill-educated, is genuinely in touch with the whole of his planet, and is becoming increasingly well informed about the position the earth occupies in the immensity of space. That is why, like the 'Petit Prince' of the poet-airman Saint-Exupéry,[1] man wants to know more about his vast domain; and of all school subjects, geography is the only one that can give him a picture and an explanation of it, which meet the exigencies of a life the horizons of which are almost limitless. Yet the subject would be impossibly overloaded for anyone who sought to learn in detail everything about geographical phenomena, and it therefore becomes inevitable that the teaching of it be selective.

Need for selective teaching

There are now so many maps, atlases, dictionaries and encyclopaedias printed in large and widely circulated editions that the learning of ever-growing lists of geographical features and names of places, countries and products can no longer be regarded as essential. Such feats of memory can be left to those who take part in radio or television competitions. A certain sum of knowledge is, however, essential if one wants to locate geographical phenomena correctly. The pupil is therefore called upon to make an effort which is certainly not negligible but is nevertheless proportionate to his mental level and his own personal experience of life.

1. Antoine de Saint-Exupéry: *Le Petit Prince*, Boston, Houghton, Mifflin, 1946. 108 pp. (Educational edition by J. R. Miller.)

The aim of any selective teaching of geography must be to concentrate on the problems, often crucial, which men need to solve so as to provide for increasing numbers and a higher standard of living. Any account, however summary, of what must be done to ensure that the world's potential resources are used for improving the conditions of existence and the living standards of those in need shows the immensity of the tasks awaiting the men of tomorrow, who are our pupils today, and who sometimes lack purpose because too often they are taught only about the past with hardly a word about what the future may have in store. When we do hold up examples for them to imitate, the goals proposed are, in many cases, beyond their reach—the solution of the problems connected with the exploration of interplanetary space, the conduct of campaigns against diseases and so on.

A purpose to pursue

In geography, on the other hand, the teacher is offering his pupils the challenge of problems which are much more within their comprehension but which nevertheless require for their solution men who have a real vocation for research. The harnessing of the resources of an underdeveloped region or country, for instance, requires the cooperation of agronomists, geologists, economists, engineers, sociologists and, above all, geographers, who have an invaluable contribution to make in the development of a territory.

What, after all, is the essential purpose of geography if not to study the relations between men living in society and the environment in which they exist? Geography has been variously defined as 'the description and explanation of the world's landscapes'[1] and 'a scientific description of inhabited landscapes and their distribution over the globe'.[2]

Geography is thus presented as a synthesizing science, but an essential preliminary to this synthesis is the analysis of phenomena from the point of view of their reciprocal interaction and the utilization made of inhabited and habitable space. This is explained in the following chapter.

Dynamic geography

This is a science which must be envisaged from a dynamic standpoint, that is to say in a context in which present and future problems

1. M. A. Lefebvre and C. Petit: *Eléments de géographie générale*, Louvain, Imprimerie St-Alphonse, 1948, p. 10.
2. Max Sorre: *L'homme sur la terre*, Hachette, Paris, 1961, p. 2.

are described and, as far as possible, explained by the developments which have led up to the existing situation, the latter being, however, only the latest link in a chain of which the succeeding links must be made as strong as possible. Considered in this light, geography, whether concerned with a district, a country or a world-wide phenomenon, will obviously demonstrate the need for widespread co-operation between all the peoples of the earth.

The problems that have to be solved to provide men with food, to supply them with water in sufficient quantity and of good enough quality, to educate them and to give them more and more scientific knowledge, grow daily greater. No single country however powerful, and not even any one of the political and economic groups which dominate the modern world, would be capable in present circumstances of undertaking single-handed the vast and vital task of improving the living conditions of the whole human race. It may be worth recalling that the investment required for planned development adequate to the population explosion of the modern world is on the same scale as that devoted to military expenditure, including the cost of nuclear and space research. Yet the sums so far allocated for help to underdeveloped countries—particularly in the tropics—are a minute fraction (5 per cent it is said) of this figure. Let us recall that one man in three does not have as much food as he needs and that the standard of living of four men out of five is below what it could be were modern technical achievements applied to daily living.

Towards international solidarity

It is the business of well-conceived geography teaching to give children, according to age, a balanced appreciation of world problems and perhaps to moderate their youthful enthusiasm for certain exploits such as those in astronautics, particularly at a time when millions of human beings are crying out for a life worthier of our age. Geography will thus help to instil in the young the valuable idea of the solidarity which should exist between all men and which Unesco calls international understanding.

Treated on these lines, geography cannot but be absorbing. The pupil will feel that it is helping him to a better understanding of the world in which he lives, the part he can and should play there, the multitude of tasks awaiting him, and the vast possibilities our planet offers us, however small we may think it, provided all our efforts are concentrated on the essential and vital questions. If that is the view taken of it, there will be a new appreciation of geography which will

acquire a leading place in any humanistic education appropriate to the second half of the twentieth century. This broader conception of it will bring larger numbers of young people to an understanding of the greatness of the task falling to agronomists, economists, geologists, engineers, sociologists, architects and geographers—all of them engaged in professions of which the new world now taking shape will have the most urgent need.

For geography to achieve this liveliness of interest, a further need is for textbooks and schoolbooks to concentrate more on setting out the vital problems—those which are of fundamental concern to regions and countries in relation to the production of foodstuffs and to physical and human phenomena. If this were done, geography teaching would become more living, more attractive and less dull than it is when it confines itself to dry lists of facts which often have no meaning to the pupil.

Two examples

Two examples will help to illustrate this argument, one from the teaching of economic geography and the other from teaching about the United Nations intended to develop in the pupils the spirit of international solidarity.

1. FRANCE'S POWER RESOURCES

In giving a lesson on the mineral resources of a country like France, it is useless to expect the class to remember the quantities of coal, iron ore, gas, etc., which the country produces. What they really need to know is that France is making considerable improvements in its power situation as a result of the following factors:

(*a*) The increasing use of Lorraine coal for the production of smelting cokes by new processes developed in Lorraine itself.

(*b*) The discovery and development of petroleum and natural gas in south-west France and, above all, in the Sahara to the south of the Algerian Republic, the effect of which will be gradually to remove the need for France to continue to import large quantities of oil from the dollar zone, thereby upsetting its balance of trade, increasing its manufacturing costs and slowing down its industrial expansion.

(*c*) Finally, the accelerated development of the hydro-electric resources of mountain areas through the new techniques for water transfers between adjacent basins.

In addition, it should be explained to the class that the improvement of trade within the Common Market is giving added momentum to this process and enabling France to modernize its industry in time to cope with a rise in population, the rate of which since 1945 has been six times what it was between 1880 and 1940.

2. TEACHING ABOUT THE UNITED NATIONS[1]

As has been shown time after time, geography classes lend themselves excellently to lessons about the work of the United Nations and the Specialized Agencies. They are not, of course, the only classes which do so, since such teaching can also be incorporated in lessons on history, civics and current affairs, and also in lessons on modern languages, literature, science and art. However, the geography syllabus, even though rigidly laid down by the education authorities, offers countless opportunities for explaining the rôle of particular organs of the United Nations. For instance, in dealing with problems of undernourishment in certain parts of the world, use must necessarily be made of the demographic statistics published by the United Nations and of the food production and food trade statistics published by the Food and Agriculture Organization. The teacher will then have to give a description of the way in which the campaign against malnutrition is organized and will speak of the technical assistance provided by the United Nations with the help of the experts of FAO, WHO, Unesco, etc. Each set of initials will call for a word of explanation to make clear the functions of the various bodies concerned.

If, as happens in many countries, the syllabus gives plenty of latitude to the teacher, it should be still easier to interest pupils in the achievements of the United Nations. One of the best examples of this comes from a school in Wales[2] where with a class of 15-year-old pupils a whole term (50 hours of lessons) was devoted to the theme 'India and the United Nations'. This enabled the teacher not only to explain how the United Nations functions but also to describe the work accomplished in India by WMO (in the study and forecasting of cyclones from the Bay of Bengal), by Unesco, by WHO, by Unicef, by FAO and by the International Bank for Reconstruction and Development (the five institutions last named having co-operated in the development of a pilot region, Teraï, at the foot of the Himalayas).

In Denmark, a secondary school for pupils from 15 to 18 years of

1. *Education for international understanding. Examples and suggestions for classroom use.* Paris, Unesco, 1959.
2. *Ibid.*, p. 16.

age has for two years included in its normal geography syllabus two hours per week on the assistance work of the United Nations in southern Italy, Israel, Jordan and Iraq. Endless examples could be quoted of teaching establishments which approach the study of foreign countries from the angle of international co-operation, which does so much to develop a sympathetic attitude in pupils.

A science which looks to the future

In economic geography, a change is called for in the methods of graphical representation followed in textbooks. Instead of giving only curves that show merely the course of phenomena in the past, there should be no hesitation about projecting them with a different kind of line, for ten or perhaps even twenty years into the future on the basis of the foreseeable prospects. However hypothetical such projections might be, they would demonstrate the consequences, good or bad, of current trends, whether in population or in regard to any particular form of production or commercial activity. This kind of treatment would awaken students to the possibilities of applying the knowledge provided by geography or related subjects for the purpose of carrying out development and equipment projects designed to secure a better utilization of the resources of the various regions of the world.

Geography will be attractive to the student to the extent that he perceives how much it contributes to the improvement of the existing conditions which it describes and explains. He may or may not make it his life work, but in any case he will not forget it when as an adult he has certain types of problem to solve in his own chosen career.

Regional studies and applied geography

It is impossible to over-emphasize the value of regional studies, in particular the study of the pupils' own locality, to give students a better notion of the attractiveness and usefulness of geography. The teaching must be adapted to fit the age of the children, and there need be no hesitation about going into detail and including the study of neighbouring areas in direct contact with the pupils' home ground. If children have once grasped the true character of their own area, if they understand its problems, its advantages and its handicaps, they will later on want to take their share in developing their native land, small or large, and will be able to play their part all the better because of their knowledge of the physical and human environment in which they live. Alternatively, the specially interesting nature of the work to be

done in other regions or even in other continents may impel some of them to seek their field of work elsewhere, even perhaps in the distant Antipodes.

What is being taught will then take on a meaning and a relevance, for it will be easy to show that a problem cannot be properly grasped except by those who possess adequate data, and it is, in fact, the relief, climate, hydrology, vegetation and natural resources of a region or country and the characteristics of its population and of the activities pursued there that constitute the essential data. Only a coherent and comprehensive knowledge of all these matters can bring about an understanding of contemporary problems and, by way of consequence, help towards the discovery of solutions that will hold good for the future.

Educational value[1]

Description and explanation bring the pupils' intellectual aptitudes into play and the teaching provided must guide and direct the development of these aptitudes in so far as geography can contribute to it.

Mental aptitudes brought into play in the study of geography

(*a*) *Powers of observation*

In its descriptive aspect, geography must be regarded as a science of observation and from this standpoint it is therefore much more akin, at primary, secondary and teacher training levels, to the natural, experimental and social sciences than to history. Hence the pupil must be trained in the habit of observing the geographical environment in which he lives, both in regard to its physical features and also in regard to human activities and the external manifestations of those activities. For distant regions which cannot be viewed physically, observation is none the less fundamental, but it will be carried out with the help of teaching aids such as photographs, drawings, lantern slides, maps, globes and diagrams.

Teaching based on observation implies systematic training in observation. It would be quite wrong to direct it only to exceptional facts and to unusual or fantastic scenes, however picturesque or romantic they may be, to the highest waterfalls, to monuments and to 'highlights' of all kinds. The things that the teacher should stress are

1. The following passages are mostly extracted from *Méthodologie de la géographie* by Omer Tulippe, Liège, Sciences et Lettres, Université de Liège, 1954, pp. 25–8.

the ordinary things, the scenes of everyday life, however prosaic. In short, we must go beyond the narrow limits of observation and avoid giving our pupils the outlook of a guide-book. Let us try, on the contrary, to direct attention to the characteristic features of the scenery, the background of the picture.[1]

The teacher's comments will then be concerned with the phenomena of adaptation to the environment or to the techniques employed and with the problems arising therefrom. By making his pupils carry out this kind of observation exercise, the teacher will develop their critical faculty, and teach them to look at things with discernment, not to admire blindly but to think out everything for themselves in terms of the knowledge they already have—in a word, to react to phenomena. This attitude breeds the spirit which informs research and will awaken in the young the wish to take part in research in due course.

(*b*) *Memory and imagination*

Time was—in the days when classes were made to memorize endless lists of names—when geography hardly served to do more than develop verbal memory. Educators have discarded this concept. Nevertheless, geography cannot be studied properly without the essential minimum of place names, countries and geographical features, and names should now be used to fix points as landmarks and guides on maps and pictures. In this way the child's visual memory is developed by making him learn geographical terms in their precise context in sketches, wall-maps or atlases. The mental process thus induced results in memorization from observation.

In addition, geography teaching does much towards developing imagination. Calling up scenes of the most diverse regions of the world requires of pupils a continuous effort of imagination. Starting from the pictures he has seen, the narratives he reads and his teacher's descriptions and explanations, the child is led on naturally to form a mental image of the world, though that image must of course be guided towards the concrete to avoid exaggerations or irrational fantasies. Hence, geography will have the salutary effect of facilitating memory-work for children by developing their visual memory and stimulating, and sometimes bridling, their imaginations.

(*c*) *Judgement and reasoning*

The pupil's powers of discrimination grow along with his increasing concentration on observing facts and mentally recording them. The

1. Pierre Deffontaines: 'Qu'est-ce que la géographie humaine?', in Georges Hardy: *Géographie et colonisation*, Paris, Gallimard, 1933, p. 9.

constant aim will be to find with him the typical features of a geographical phenomenon, a situation, or a series of related facts or scenes. To achieve this, it is best to advance by stages:

1. The pupil is trained to analyse, compare and classify so as to awaken in him a sense of relationships and connexions and lead him to formulate questions and, with a knowledge of the facts involved, to look for the 'why' of things.
2. He is led on to identify and recognize correlations and, where possible, causes.
3. The teaching is so planned that, in his search for the 'why', he does not overlook the existence of various orders of causes and does not stop short at any one of them.
4. He will be taught to take account, as scientific geography does, of all physical and natural forces, as well as of the will and the irrational behaviour of men, and of the needs of existence, etc. In a word, the teaching he is given will accustom the pupil to think—as well as to observe—geographically.

(*d*) *Inculcation of a geographical outlook*

As a result of all this, geography will give the pupil a concept of physical space, in all its concreteness and complexity—a concept made up of a whole range of component items, some of which can be easily and immediately recognized and others which require work of a painstaking and precise nature. The pupil will be given a vision which will enable him to take an overall view, by grasping the relationships by which individual phenomena are linked together within the whole of which they are the parts.

To sum up, because it aims at developing the intellectual aptitudes, the teaching of geography should be directed to awakening 'geographical curiosity' (immediate aim) whilst at the same time seeking the mediate and ultimate objective, which is the inculcation of a geographical spirit in harmony with the pupil's general training. This process will enable the pupil to see what are the problems of the day, and to form sound judgements on the solutions suggested or on the failure to suggest them. Being possessed of a geographical outlook he will adopt a positive attitude to the world before his eyes and this will render his travels both more instructive and more enjoyable.

2 The nature and spirit of geography teaching

Purpose of the source book

THE ESSENTIAL purpose of this *Source Book* is to supply geography teachers with a plentiful selection of specimen methods and particulars of materials and documents they can use to enrich their teaching and make it more effective in its impact on their pupils. But all this storehouse of teaching material would be valueless if it did not play its part in revealing to the pupils the true nature of geography.

The fact is that with identical material, the teacher can either succeed or fail utterly—can either bore or grip his class. He can either submerge them under an avalanche of exercises, facts to remember and names to learn, or he can enthrall them with the discovery of the different aspects of the world's surface and the great adventure of mankind as it has unfolded for thousands of years past on our planet.

Documents and instruments are not ends in themselves; they must be used in the service of geography and of the geographical education of the pupils. Hence, after the first chapter's emphasis on the value of geography, and before going on to discuss methods and materials in the chapters that follow, teachers must now be asked to consider the nature and spirit of the teaching of geography.

Conflicting definitions of geography

Unlike other sciences or disciplines (physics, chemistry or natural science, the human sciences, social or economic sciences) whose objects are clearly defined and universally agreed upon, geography is the subject of a multitude of widely differing definitions, concepts and aims profoundly influenced by the personalities and temperaments of individual geographers.

It is easier to define a geographer, or the geographical spirit, than to define geography itself, which is a task many geographers will not even attempt.

Whatever the age of his class, the geography teacher needs to be as

clear as possible in his own mind about what he has to teach. There must also be consistency up to a point in the teaching given in all classes of schools and colleges throughout the world, though probably we shall never achieve anything like the uniformity shown by chemistry teachers when they speak of oxygen, or by natural science teachers when they describe the circulation of the blood.

We must nevertheless take care that the teaching of geography is not lacking in specific features and incapable of making its own individual contribution. Very frequently what is taught as 'geography' is either a collection of facts intended to give a complete picture of a continent, a state or a region; or it is a series of introductions to specialized subjects—climatology, botany, demography, political economy or sociology.

Geography teaching may be said to oscillate between these two extremes. The trend towards the first of these extremes is often a feature of geography teaching at the elementary (ages 7 to 10) and middle (ages 11 to 14) levels. The picture given becomes a catalogue of products, and lists of rivers, mountains, towns and states. This information is, of course, not useless, for it is a good thing for children to learn the names of the great mountain systems, the chief cities and main products of nearby or far-distant states. But such knowledge is, as it were, only the prologue, the prelude to learning geography. If this was merely a matter of lists and catalogues, a dictionary or the gazetteer of an atlas could with advantage take the place of the teacher.

The second trend is found more in the second cycle of secondary education (14 to 18 years). Instead of instilling the spirit of synthesis, localization and correlation which is characteristic of geography, there are repeated digressions that go outside the proper field of geography in order to supply the pupils with facts concerning economic, sociological, demographic and other questions.

This is understandable, since in most countries the teaching of the social or economic sciences finds no place in school curricula and no time is set aside for it and only the geography teacher can provide it. It is regrettable that he should do so at the expense of geography teaching.

The sciences formerly considered by geographers as auxiliary or secondary to their subject may, indeed, have developed and become major disciplines in their own right, but they have far from done away with geography. Certainly, it may be presumed that no geography teachers think so.

Hence, geography teaching should in no respect reflect either the

'catalogue geography' trend or that which makes of it simply a stepping-stone to other sciences.

Cases may arise where it is necessary for the geography class to be used for introducing sciences which are not provided for in curricula or time-tables, but any such situation should be regarded as exceptional. For this reason, provision should increasingly be made for courses in civics or the rudiments of demography or economics and time-tables should be rearranged accordingly.

From another angle, too, the geography teacher is constantly subjected to centrifugal forces of this kind. There is the danger that the wide variety of sources of information, the rapid progress of the natural and human sciences and the non-geographical character of the reviews, journals, newspapers, yearbooks and statistical bulletins whence he derives his material and information, may distort geography lessons or make them seem unnatural. The geography teacher must therefore ward off this danger of unreality and of dispersal by constantly returning to the fundamental bases of the subject he teaches.

This is why, while continuing to observe extremely flexible limits, it will be interesting to consider a few of the key concepts around which geography teaching must revolve.

The various definitions and concepts concerning geography can be reduced to three main types, of which the first and second are fairly broad and the third more restrictive but all three of which are truly geographical in spirit. They are:

1. Geography as a synthesis.
2. Geography as the study of the spatial relations of phenomena.
3. Geography as the science of land use.

Geography as a synthesis

Whether the question under discussion is one of general geography (e.g. calcareous relief, equatorial forests, world population or world rice production) or one of regional geography (continent, state or smaller region), the teacher's object must be to show all its aspects, all its facets, and to present as complete a picture as possible. He must analyse successively the variety of factors and phenomena encountered in a given area or present on the earth's surface, their characteristic features, why they are where they are, and why their extent is what it is, how they have evolved in space and time and the consequences of all kinds arising from them.

This presentation of the subject gives the class a full and balanced knowledge of a region or of some feature of general geography. But the dangers of this method need to be pointed out, and attention must be drawn also to the special character of geographical synthesis. The principal danger is that of allowing the synthesis to become an encyclopaedia, and this danger is particularly important in regard to regional geography. Teaching about a region or country usually starts with its geology and its relief, and finishes with its economic problems or an analysis of its foreign trade. Between these two extremities every 'drawer' is successively opened and emptied of its content, passing from demography to economics. But such a sum of information does not of itself constitute a geographical picture of the region. The special character of geography teaching lies in the analysis of the relations between phenomena. Instead of considering them in isolation, the geographer must show that they are interdependent and interact in the most varied ways.

Each geographical fact is the result not of a single cause but of a series of causes; for instance, relief is the result of erosion often of several different kinds acting on a particular geological structure; the volume of water in a river and its seasonal variations are determined by a multitude of geological, pedological, climatic and topographical factors.

The class must be gradually introduced to the concept that apparently simple facts are complex and interrelated, though geographical synthesis achieves its full purpose only when it reveals the interdependence between the facts of nature and the facts of human life and the two-way relations between them. It then shows what is man's share and what is nature's in the features of the facts studied and in the causes that produced them.

In general geography, multitudinous borrowings from neighbouring disciplines often result in a tendency to sacrifice the description of facts to an explanation of their causes. For instance, in studying climate the circulation of the atmosphere is likely to be dealt with at length, to the neglect of the actual climatic data; but the geographical value of this study resides only in the climatic consequences of the atmosphere's circulation—temperatures, precipitations, seasons, variations from the mean, types of weather.

Similarly, in studying land relief there is a danger of the progress of geomorphology leading the teacher to enlarge on the processes whereby the relief was formed and to skirt the description of types and forms of relief.

Truly to live up to its name, 'synthetical' geography must be

directed towards a specific end and not simply towards the overall knowledge of a region. Its real aim must be the description and explanation of the landscapes of the varying geographical milieux, natural and human, on the earth's surface.

It can be said that the presentation of a region has not been successful if the pupils do not 'see' its different environments and landscapes and do not know the causes that produced them and the changes they have undergone. Similarly, in general geography, pupils must understand the place and rôle of the phenomenon they are studying in producing a particular milieu or landscape.

Example no. 1

DESCRIPTION OF JAPAN

This and the succeeding lessons in the present chapter are intended rather to show teachers the attitude they must adopt in handling various subjects than to provide a set framework for a course of lessons for pupils of any particular age. The necessary 'teaching' pointers are provided in the specimen lessons of Chapter 4, which is devoted to teaching techniques. In any case, no teacher could talk to his class about Japan, whatever the ages of the pupils, without showing them Asia and Japan on wall-maps and in atlases, or without drawing one or more sketches on the chalkboard, and without letting them study photographs of the country either projected on the screen or in books.

1. An elongated archipelago

Japan consists of a total of 1,042 islands, giving a land area of 143,000 sq miles (369,000 sq km) (British Isles: 122,500 sq miles; 314,000 sq km) but only four of these islands are of considerable size —Yeso or Hokkaido (30,000 sq miles; 78,000 sq km), Hondo or Honshu (88,000 sq miles; 228,000 sq km), Shikoku (7,000 sq miles; 18,000 sq km) and Kyushu (14,000 sq miles; 36,000 sq km).

2. Exceptional situation

Lying off the coast of Asia (never nearer than 300 km), Japan extends over 18° 30′ of latitude, from the 27th to the 45th parallel north (the distance from Agadir in south Morocco to the Brittany peninsula in France, or from Key West, Florida, to Nova Scotia on the Atlantic coast of North America). The British Isles extend over 9 degrees of latitude only. The strategic value of this situation is

obviously very great and Japan is the gateway to eastern Asia, controlling the lines of communication.

The islands lie at the meeting point of the great ocean currents of the West Pacific and the resulting abundance of fish in Japanese waters constitutes one of the country's major nutritional and commercial resources (situation comparable to that of Newfoundland).

3. Extension into two climatic zones, both favourable

The Japanese archipelago is partly in the subtropical zone and partly in the temperate zone; the southernmost islands abut directly on the tropical monsoon belt of Asia, there being no intermediate desert belt between the tropical and subtropical zones on the eastern face of the continent. As a result of this special feature Japan has an exceptional wealth of plant life and great agricultural potentialities.

However, the country's position under the shadow of the immense Asiatic landmass, and off its eastern face, produces sharply contrasting climatic conditions: the temperate climate is of the continental type, with hard winters and with cold winds from Siberia and snowfalls affecting the whole northern half of the country; whilst the Pacific coast of the southern half lies open to violent typhoons which cause destructive tidal waves.

4. Mountainous islands of sharp relief

The Japanese archipelago consists of chains of mountain tips rising out of the Pacific, of recent geological date and often volcanic in origin (there are about 200 volcanoes of which 58 are still active). The frequent earth tremors (a major earthquake about every two years and four earth shocks per day) witness to the youth of these islands. In the four major islands 75 per cent of the land surface is covered with mountains with steep flanks ravined by the heavy run-off and cut by the numerous streams which are fed by the abundant rainfall and by the melting of the snows (the action of erosion is extremely violent on such young mountains rising abruptly from the sea).

Those mountains which are too steep for cultivation are wooded (forests cover 60 per cent of the land area of Japan). The combination of heavily watered mountains and numerous deep-cleft valleys has given Japan a considerable hydro-electric potential which is easy to develop. The plains (26,000 sq miles; 68,000 sq km, or 18 per cent of the land surface) are all alluvial, having been formed by the rivers

and torrents and by the sea. The plainlands are non-continuous, occurring in small patches squeezed between two mountain slopes or between the mountains and the sea. This explains the fragmentation, the sporadicity of all the human and economic phenomena—population, cultivated land, industries, towns. Japan is a patchwork state, the intensively cultivated and densely populated plainlands contrasting sharply with the wooded and unpeopled mountain areas.

5. Overpopulation

From 27 million in 1846, the population of Japan had increased to 71 million by 1940 and to nearly 93 million in 1960 (the mean density of 655 per sq mile: 253 per sq km, high as it is, has no great significance when we recall that only 17 per cent of the country's land area is cultivable).

The main problem of Japan is the demographic problem: the problem of feeding and finding work for this teeming population. This problem Japan has only partially resolved by intensive development of all its resources, by meticulous utilization of the cultivable area, and finally by birth control.

6. A major economic power

After remaining in voluntary isolation until 1853, Japan, beginning in 1868, effected an amazing transformation of its economy in the course of a few decades. It was the first Far Eastern nation to achieve equality with the Great Powers of the modern world. Despite the exiguity of its living room, its large population and its enormous industrial and commercial expansion made it, from the close of the first world war (1914–1918), one of the most powerful states not only in Asia but in the whole world.

The honours list of this upward climb speaks for itself: in 1960 Japan's position among world producers was—

first for fisheries, silk, staple fibres and shipbuilding;
second for cotton yarn, rayon and sulphur;
third for rice, paper, sulphuric acid and nitrate fertilizers;
fourth for woollen yarns and cement;
fifth for steel and merchant shipping;
sixth for electricity and copper;
seventh for cast-iron, aluminium and motor vehicles;
eighth for petroleum refinery products;

ninth for coal;
tenth for gold;
fourteenth for iron ore.

Example no. 2

PERU AS A TYPICAL COUNTRY OF THE ANDES[1]

Aim

To introduce to 14- to 16-year-old students one of the most contrasting countries of the world, from both physical and human standpoints.

Equipment

The teacher should draw on the chalkboard an outline map of Peru, such as Fig. 1; exhibit a wall-map of South America; ask students to use their atlas and textbook at the proper pages; and should have, beforehand, consulted a statistical yearbook for up-to-date figures on the area of Peru, its population, production and trade.

1. Introduction

Peru, one of the tropical countries of South America, is a land of great contrasts and of great geographical interest. It has some of the driest regions and some of the highest settlements in the world, yet most of the area is covered by almost uninhabited, dense, equatorial forest.

2. The land

The country consists of three main regions:

(*a*) The narrow coastal desert (*la costa*), one of the driest regions of the world. The mean annual rainfall in Lima is under 1·5 in (about 30 mm).
(*b*) The high Andes (*la sierra*), with ranges and plateaux, and many peaks over 17,000 ft (5,100 m), some of the highest being snow-covered the year round.
(*c*) The great forested Amazon lowlands (*la selva*), crossed by rivers flowing towards the distant Atlantic. Rainfall in places here exceeds 80 in (about 2,000 mm).

1. Example prepared by John Cole, Lecturer in Geography at the University of Nottingham.

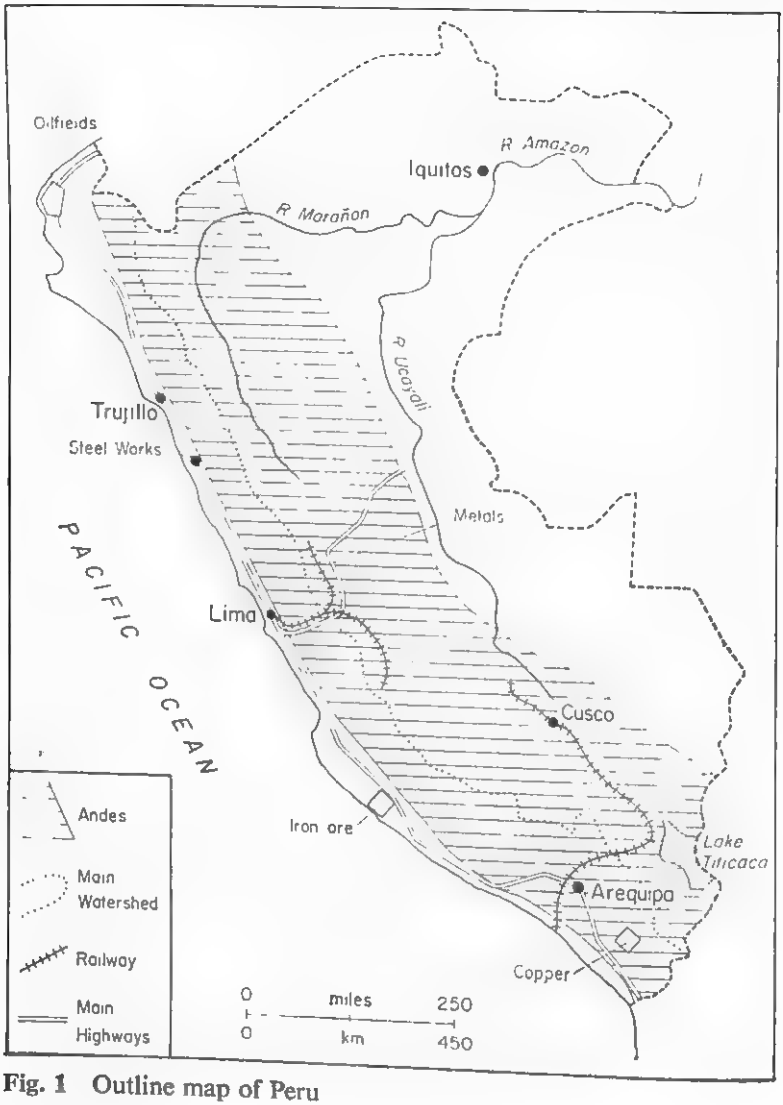

Fig. 1 Outline map of Peru

3. The people

Peru has long been settled and for at least two thousand years there have been civilizations in different places. In about 1500, before its conquest by the Spaniards, the Inca Empire, with its American Indian inhabitants, extended along the Andes and the coast. Today there are still many ruins from the pre-Spanish cultures. In the desert, the adobe (mud brick) walls of buildings of quite large cities are still

partly standing, while in the south of Peru, Cuzco and other places have remains of stone buildings. The Indians did not use metal and it is thought that the stones they cut had to be shaped with even harder stone implements. There was also a remarkable system of roads and, although the wheel was not used for transport at all, fast runners delivered messages in relays over great distances. The Spaniards settled mainly along the coast but have mixed with the Indians. Spanish is the official language, but Indian languages are also spoken. There are now more than 10 million people in Peru. Over half live in the Andes, but Lima and its port Callão now have nearly 2 million, and less than 1 million inhabit the Amazon lowlands.

4. The economy

Over half of the people in Peru work in agriculture. Along the coast many small rivers from the Andes bring water for irrigation to the desert, and cotton and sugar are grown. A new source of wealth is the great fishing industry off the coast.

In the Andes, rainfall is sufficient (25–30 in, about 700 mm), but not abundant, and temperate crops such as wheat, barley and potatoes are cultivated, while cattle, sheep and llamas graze on the mountain pastures. Peru is the original home of both the potato and the llama. In the Amazon lowlands there is little agriculture, but wild rubber is still gathered.

For a time Peru produced more silver than any other country in the world. Now copper, lead, zinc, and iron ore are mined, and oil is extracted in the north. Industry is developing fast; most of the light manufacturing is in the capital. An iron and steel works has recently been opened north of Lima.

5. Transport

Considering its population, Peru covers a large area and the mountains make movement between the coast and the interior difficult. It is about 1,000 miles (1,600 km) from north-west to south-east. There are regular shipping services and many ports along the coast and, just inland, the Pan-American highway, but only two railways and one good road penetrate the Andes, and only the road continues to the Amazon lowland beyond. Here, people have to travel by river or air.

Like the physical conditions and agriculture, the appearance of settlements differs greatly in each of the three regions. Along the coast are box-like houses with flat roofs and whitewashed adobe

walls. They are mostly single-storey, but in Lima itself there are now many modern steel and concrete buildings with many storeys. In the Andes, two-storey houses with sloping thatch roofs are characteristic. The climate is colder and the Indian men go about in thick *ponchos* while the women wear heavy, gaily coloured skirts. In the Amazon lowland wood is the main building material, while roofs have to be made of thick leaves and houses are often built up on stilts to avoid flooding. Throughout Peru most towns and many villages have a gridiron layout of streets, a plan used by the Spaniards in South America whenever they founded a settlement in their colonies.

6. Problems

Now that Peru is growing conscious of the need to develop its economy it is faced with many difficulties. Population is increasing fast and people are leaving the land and moving into the towns, especially Lima. Owing to the lack of good roads it is difficult to bring improvements to the more remote rural areas, and impossible without new roads to use the agricultural land and the great hydro-electric potential beyond the Andean watershed. The case of Peru shows clearly that without adequate roads and railways a country cannot fully use its resources.

7. Figures

Latitude:	between 1° and 17° south of the Equator.
Area:	almost 500,000 sq miles (1,285,000 sq km).
Population:	(1961) 10,365,000.
Density of population:	21 per sq mile (8·5 per sq km).
Exports:	cotton (100,000 tons)
	sugar (500,000 tons)
	copper (150,000 tons)
	iron ore (6,000,000 tons)
	fishmeal (500,000 tons).

Geography as a study of the spatial relations of phenomena

Geography has always been regarded as the subject which studies the localization of phenomena (Vidal de la Blache calls it 'the science

1627

of place'), which describes and explains the 'differentiation of terrestrial surface space' (Carl Sauer's *areal differentiation*). These two complementary aspects—localization and areal differentiation—must be reflected in all geography teaching.

Localization

All phenomena on the earth's surface have location—are characterized by a particular distribution, by having a particular extent. Within the domain or area of the phenomenon, its distribution may be homogeneous (plant formations, type of soil) or, on the other hand, may vary in density and intensity (population densities, range of a culture). It is extremely important to describe these characteristics so that it may subsequently be possible to determine their causes.

For instance, the occurrence of certain high population densities in Africa cannot be explained if these heavily populated patches are not located with precision and set in their relationship with causal factors of a natural, human or economic character (example no. 4). Similarly, regional geography should give pupils the pattern of the localization of the major phenomena (example no. 3).

Without the help of maps and constant reference to them, and unless care is invariably taken to locate and delimit phenomena, there is a danger of regional geography becoming abstract and unreal. It is not enough to know that there are mountains, rivers, forests and agricultural lands. All must be located, delimited and 'placed' relatively to each other.

Areal differentiation

Concurrently with his consideration of the location of a phenomenon, the geographer should also turn his attention to the relations existing between the various phenomena present in a given space. A forest, a river, or a village necessarily stands in some relationship with other geographical elements which coexist in that place (a certain rainfall, grasslands, slopes, a town).

The coexistence may be merely coincidental. Thus there is no causal connexion between rainfall, soil fertility or the existence of a village and the presence of iron or copper ore. However, causal relationships, links of interdependence, do appear in the conditions concerned with the working of the seam—the length of time during which operations have been going on, the ease or difficulty with which the ore can be extracted, transported and processed locally, and the

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recruitment of labour. In turn, the presence of the ore—as soon as it is being worked—is the cause of changes in the space where it occurs, the growth of industries, the development of the mining village type of habitat, attraction of labour from agriculture, changes in crops grown, deforestation, construction of roads and railways, changes in population density.

In general, interrelationships to a greater or lesser degree are invariably discernible in the phenomena studied in geography: relations between phenomena of nature (climate–soil, climate–vegetation, relief–soil, relief–climate), relations between human and economic phenomena, relations between natural and human phenomena. It is, moreover, this last category of relationships which the geography teacher should deal with most thoroughly and carefully. For it is only in the geography class that pupils will learn to group the relationships in space and time that exist between natural environments and types of civilization, to assess the natural and human factors in landscapes, and to measure their reciprocal influences.

In geography teaching real situations should be exhibited. Human groups and economic activities should never be divorced from their real surroundings but should always be reintegrated in their environment.

Classes should be familiarized progressively with two important ideas—namely:

(*a*) That the relationships between natural environments and human groups are complex and flexible, possibly not between man and nature regarded as entities, but only between a wide variety of natural environments and men no less varied in their needs, techniques and ideas, so that such relationships differ widely both chronologically and spatially.

(*b*) That the world offers great diversity and that, while there are of course definable types of geographical phenomena (types of climates, soils, habitats, ways of life) which are indeed comparable if we make certain generalizations, arrange them in some sort of plan; but considered from the standpoint of its connexions with other phenomena, of its absolute quality and, above all, of the pattern of its distribution, each phenomenon has a unique and exceptional quality.

Geography teaching should begin with examples of relationships that are easy to grasp and with simple geographical types, and should little by little lead the student to discover or at least to be conscious of this complexity and diversity.

This is why it is important in geography teaching to present these two complementary aspects—that of 'geographical types' and that of 'localization, extent, pattern of distribution'.

Example no. 3

WORLD RAINFALL DISTRIBUTION

This example will provide several lessons for the 'leaving' classes of secondary schools. In addition to Figs. 2 and 3, the teacher will need a wall-map of the world, to be supplemented by chalkboard sketches as the lesson proceeds, and should ask his pupils to use their atlases and textbooks to supplement the notes they take in class.

1. Measurement of precipitations

Rainfall is measured with a rain gauge. The apparatus consists of a wide-mouthed funnel delivering rainwater into a graduated glass jar from which the amount of water precipitated per surface unit can be read to give the 'height of rainfall' expressed in millimetres.[1] Monthly and annual rainfall figures are obtained by adding together the daily figures for height of rainfall, and from these monthly and annual mean rainfall is calculated. There are, however, abnormally dry and abnormally wet years (the city of Algiers had 400 mm of rain in 1913 and 1,305 mm in 1947)[1]; accordingly every effort is made to base the calculation of means on measurements extending over many years (the annual mean for Algiers is 762 mm).

This irregularity of rainfall distribution in time and space should not cause us to overlook that, in the world as a whole, the water falling as rain is supplied by evaporation and the amount of evaporation is determined by solar radiation, which does not vary widely in intensity. Hence, the world mean annual rainfall is relatively stable at between 900 and 950 mm, the equivalent of a sheet of water with a uniform depth of 90 cm extended over the whole surface of the world.

The mean rainfall figures are used for plotting isohyetal maps (an isohyet is the line joining all the observation points with identical mean monthly or annual rainfalls). Thus, the 500-mm annual isohyet shows on the map all the regions of the world where the total rainfall in one year would cover the soil surface to a depth of 500 mm if there were no losses by infiltration, run-off or evaporation.

2. Rainfall distribution[2]

Study the rainfall map (Fig. 2).

(*a*) Which are the regions of highest rainfall in the world (over

1. 1 inch = 25·4 millimetres.
2. This example and the accompanying map (Fig. 2) are taken from *Géographie, classe de seconde*, by M. Ozouf and P. Pinchemel, Paris, F. Nathan, 1961, pp. 72–3.

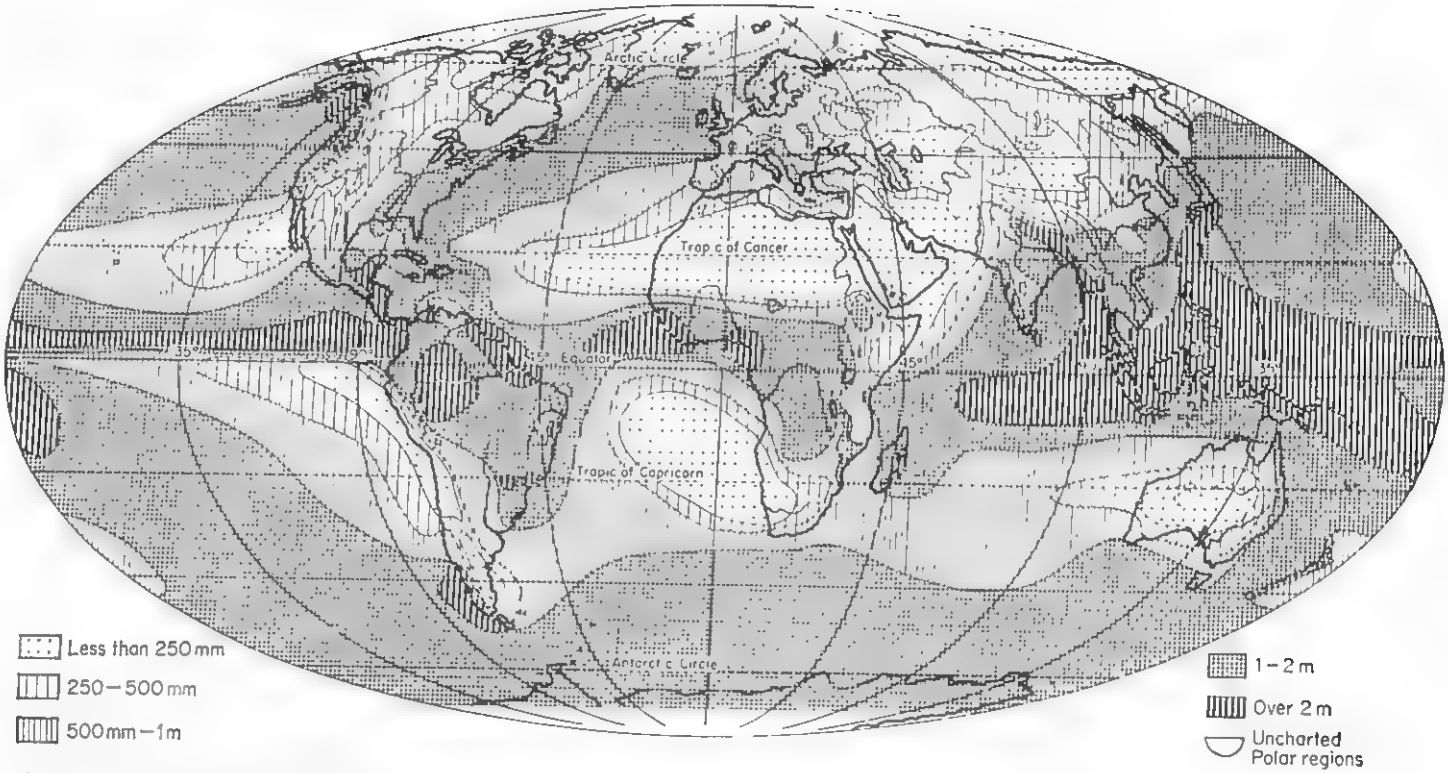


Fig. 2 Mean annual rainfall

(Map taken from *Géographie, classe de seconde* by M. Ozouf and Ph. Pinchemel, Paris, F. Nathan, 1961. pp. 72–3)

2 m)? List them and state their exact limits. What are the areas of highest rainfall in the temperate zone? Explain their location. What special feature distinguishes South-east Asia from other regions in the same latitudes? Can you explain why rainfall is not very high in the Congo basin?

(*b*) Which are the regions of least rainfall (under 500 mm)? In what respect does the distribution of these regions in the Northern Hemisphere differ from that in the Southern? Do you see any similarity in the patterns of distribution of the dry areas in Africa, Australia and South America? What is distinctive about the distribution of the dry regions in South America? Try to find the explanation. Which are the main coastal deserts of the world? How do you explain their existence?

What differences do you notice between Europe and the western half of North America? What is the reason for the disparity between them?

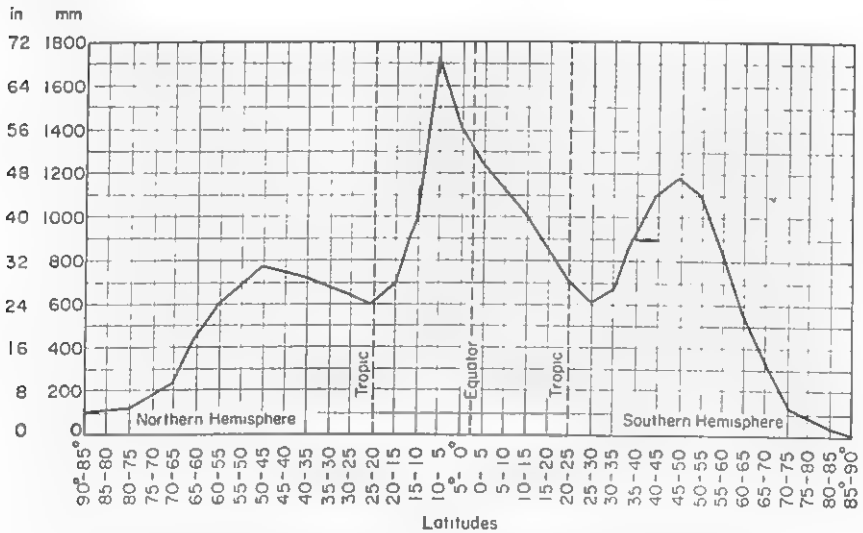


Fig. 3 Graph showing distribution of rainfall according to latitude

3. Reading the map

Study of the map shows at once that there is a certain zonal distribution of precipitations according to latitude. This is shown still more clearly by the graph (Fig. 3). Distribution in each hemisphere is symmetrical in relation to the thermal equator (7° north latitude). The equatorial region is the rainiest in the world (over 2 m). It corresponds

to the zone of tropical calms. It is flanked by two dry zones (600–800 mm) along the Tropics of Capricorn and Cancer and these correspond to the subtropical high-pressure belts of dry, anticyclonic air masses.

Next come two rainier belts in the temperate zones, the one in the Southern Hemisphere being more marked, as that hemisphere is largely sea and thus has more abundant rainfall. This is the zone of the 'Westerlies' through which pass disturbances from the polar front. Finally, the polar regions, areas of almost continuous high pressure, are desert, with far lower precipitation than the hot tropical deserts.

There is, then, close correspondence between the pattern of atmospheric circulation and zones of precipitation, but closer study of the map shows that the zones of precipitation are anything but continuous belts and there are many anomalies.

The reason is that rainfall is also determined by the distribution of sea and land, by the shape of the continents and the orientation of their coasts and especially by the relief of the land surface. Over a world which was all water, rainfall distribution would be much more regular.

4. Regional contrasts

(i) *Minimum rainfall regions*

These are the areas where rainfall is under 500 mm (the true desert areas receive less than 250 mm of rainfall).

(*a*) *Southern Hemisphere.* There are three vast low-rainfall regions covering sea (South Atlantic) as well as land (Kalahari Desert, Australian Desert, Atacama Desert and the Peruvian coastal desert). These regions coincide with the cells of high pressure where the divergent and descending winds are dry. The deserts lie on the western seaboards of the continents, the eastern seaboards receiving rain brought by the south-easterly Trade Winds.

In South America, the dry conditions of the tropical desert are continued to the southern tip of the continent by a mid-latitude desert on the Patagonian plateaux. Here again, the contrast between the two coasts of the continent is very great, but this time it is the eastern seaboard (Argentina) which is dry whereas the west coast (Chile) has an abundant rainfall, as the westerly winds of the temperate zone discharge all their moisture on the western face of the great Andes range and are dry when they sweep south to Patagonia. Thus, unlike the tropical deserts, the Patagonian desert is caused by the windbreak of the Andes and is a 'leeside' desert. As a result the

deserts of South America together form a vast diagonal dry belt running from the equator to latitude 60° south beginning with coastal deserts and ending with deserts caused by the relief.

(*b*) *Northern Hemisphere.* A similar pattern is found in North America where the arid condition of the coastal desert of southern California associated with the subtropical high-pressure centres of the area is succeeded by a 'leeside' desert running right up into northern Canada, consisting of plateaux, steppes and prairies severed from the rain-laden westerly winds by the barrier of the coastal chains and the Rockies proper.

In the Old World, a line of deserts runs through the tropical belt starting with the tropical desert of the East Atlantic and continuing through the Sahara and the deserts of the Middle East to the deserts of Asia. In the temperate zone, unlike North America, the fact that the plains of Europe lie wide open to the oceanic air masses holds the deserts and steppes thousands of kilometres back from the coasts. Thus Europe emerges as the only large region in the world with a moist temperate climate spread widely over the interior. The Northern Hemisphere's two chains of arid zones (North American and Eurasian) are connected by the continental part of the polar region, also with extremely low precipitation, so that in the Northern Hemisphere there is a vast arid crescent with the horns towards Central America and enclosing well-watered regions which comprise the eastern part of North America, most of Europe and Russia in Europe and the Mediterranean coasts of North Africa and the Near East.

(ii) *Maximum rainfall regions*

These regions receive over 2 m of precipitation per year and comprise:

(*a*) *A vast equatorial region*, almost girdling the earth, running from the Seychelles (off the east coast of Africa) to Central America, via the East Indian Archipelago with lateral branches in the tropics north of the equator corresponding to the path of the monsoons (Gulf of Bengal, Ganges Plain, Philippines, southern Japan). The belt is non-continuous in South America (where it is represented by the Amazon country, the coasts of the Guianas and north Brazil), over the Atlantic, and in Africa (on the West African coast and the coast of the Gulf of Guinea).

(*b*) *Isolated areas*, where rain-bearing winds reach lofty coastal land, e.g. the monsoon on the west coast of India, the south-east Trades on the eastern coast of Madagascar and the Westerlies on the west coast of New Zealand, Chile, Norway and Canada.

Example no. 4

THE DISTRIBUTION OF NON-URBAN POPULATION IN THE CONGO BASIN

Like no. 3, this example is intended for advanced secondary school classes. Teachers wishing to use it will need to prepare the lesson with the utmost care and they will require wall-maps and atlases showing the physical structure of Central Africa and the density of population.

In the Congo Republic (ex-Belgian Congo) the mean population density in the country areas in 1952 was 4·23 to the square kilometre. This figure appears extremely low, but as it is calculated in terms of the entire land area, it is not really significant.

Professor Gourou, to whom we are indebted for the material used for this example, has calculated the density of the rural population with reference to the area under active peasant cultivation, and arrives at the surprising figure of 437 to the square kilometre.[1]

Thus the Congo basin presents the paradox, common in the tropical zone, of a 'heavily populated agricultural area in a practically empty region'.

1. The facts

It will be seen that 29 per cent of the rural population live in regions where the density is below 4·23 to the square kilometre. This accounts for 74 per cent of the land area of the Congo Republic. Only in 0·30 per cent of the area are there 50 or more inhabitants per square kilometre, with an absolute maximum density of 137 in Ruanda and Burundi. We thus find that there are relatively wide variations in population density in a natural environment, of the Equatorial Forest, which seems to be homogeneous.

Studying the distribution of population according to latitude, we find—

that the zones of lowest population are on the equator and down to latitude 2° south;
that the zones of highest population density occur around latitude 3° north (6 per sq km) and latitude 5° south (10·3 per sq km).

2. Natural factors

These zones more or less coincide with the borders of the Equatorial Forest proper in the deciduous forest sectors where the long,

1. Pierre Gourou: *La Densité de la population rurale au Congo belge*, Brussels, Académie Royale des sciences coloniales, vol. I, part 2, 1955. 168 pp.

dry season is still not very pronounced. However, the relationships are far too tenuous to justify the inference of zonation of population densities linked with that of the climates. Moreover the climate cannot account for the variations in density within homogeneous climatic zones.

Account must be taken of other natural factors such as the relief and the soils. No close relationship is discernible, however, between the relief and high population densities. While the mountain country of Ruanda and Burundi carries a heavy population, other mountain areas do not and the layout of the relief has been an important factor only to the extent that mountains opened or barred the hill country to currents of migrants from East Africa.

On the other hand, study of the soils so far as they are known shows very distinct direct influences. In Stanleyville Province there is a region with no population where the soil is granitic and thus very poor, but there are relatively high densities of population where the soil is developed from metamorphic schists. A similar contrast is found between the regions where the sands of the Kalahari crop out, which are sparsely populated, and areas where the outcrop is the sandstone of the Karoo, where the population density is higher.

Finally, the vast, marshy stretches of the Congo basin are empty of population whilst, on the other hand, density rises around the lakes in which fish abound.

3. Human factors

As the natural factors are insufficient to explain the present distribution of population, the human factors must be considered. They are of two sorts:

(*a*) *Historical factors*, such as population movements and the effects of slave trading which depopulated the coastal areas and the banks of the rivers.

(*b*) *Factors connected with civilization*, which are extremely important. The populations vary in the degree of their cohesion and social and political organization. They have techniques in varying stages of development, for land clearing, maintenance, fertilizing and crop rotation. The more highly evolved populations are able to make a better use of space. Accordingly, population density is high among the Bakongos and Balubas, peoples with Sudanese affinities.

Thus the explanation of the present non-urban population map of the Congo basin lies in a complex set of factors which are of a natural,

ethnic or historical character, or are connected with aspects of civilization.

Geography as the science of land use

The science of landscapes

When the definitions of geography which have been propounded since the beginning of the century by the great geographers of all countries are compared, it is striking to note how nearly they agree. Geography, it is said, is the 'science of landscapes', or the 'explanatory description of landscapes'.

Today, the wording rather than the substance of this definition is criticized from two angles. On the one hand, it is held that the definition restricts too narrowly the field of geography and reduces it to being merely descriptive. Secondly, it is urged that the artistic and touristic connotations of 'landscape' make it an inappropriate term for scientific use, while the fact that in some languages the word for 'landscape' means also 'region' introduces a risk of confusion.

Neither criticism is sound and, even though the definition of geography might be worded otherwise, its substance remains unaffected.

The description and explanation of a natural landscape, whether rural or urban, can be extraordinarily instructive.

Each landscape is the expression of a *certain organization of space*—spontaneous or deliberate, conscious or unconscious.

Where there was originally a natural environment with very definite characteristics, the arrival of man, recently or in the very distant past, has transformed it, wholly or partially, into a humanized landscape. Men have organized this environment, this space, in the way determined by their needs, their techniques and their possibilities. They have appropriated this space, parcelled it out, and developed it, clearing the ground, digging canals, preparing ploughlands, and selecting sites for their farms, their villages, their towns. They have utilized this space for their crops, their herds and their industries.

Landscape the expression of a civilization

Thus a humanized landscape is indeed the visible geographical expression of a civilization, and of the whole of its economic and social life.

Humanized landscapes are not static but evolve and change as a result of agrarian reforms, the growth of towns and the construction of new communication systems. The way in which men organize and

utilize space, and control the natural forces within it, throws light on the nature of their relationship to their physical environment and elucidates the modifications they have introduced in it.

It is clear how much can thus be revealed by an analysis of the landscape, provided, of course, that it goes beyond a mere description.

In the world of today, with its overpopulated and its underdeveloped regions, the problems connected with territorial development, and therefore with land use, are becoming increasingly acute, so that geography, the science of land use, acquires enormous immediate importance and indisputable usefulness. The analysis of the ways in which land is used at present makes it possible to highlight the advantages and shortcomings of current uses. It opens the door for the analysis of the problems of tomorrow and of the development plans being prepared in many states. An agrarian reform, which is initially a political measure, results in a new pattern of land use, the creation of new landscapes, the establishment of new relationships with natural conditions and new types of habitat.

This analysis of land use can be carried out at all school levels, beginning with the local landscape, with a study of its features, and of recent changes in it. Here again, pupils will thus acquire a sense of the complexity and the interdependence of phenomena. Through the abundance of photographic material available, the landscapes of all countries can be presented and explained. Aerial photographs are a particularly valuable tool in studying land use.

Example no. 5

A NORTH AFRICAN TOWN: FEZ[1]

This example can be used with pupils of secondary school leaving classes for the purpose of describing Moslem civilization. Teachers will need a wall-map of Morocco or, failing that, of North Africa. A simplified sketch of Fig. 4 should be drawn on the chalkboard and, if an epidiascope is available, the figure should be shown on the screen together with any other views of Fez that can be obtained.

Fez is one of the eight towns in Morocco with a population of over 100,000 and it is the fourth town in the country.

It is also one of the four 'imperial' towns of Morocco, that is to say, a capital founded by one of the dynasties which have ruled the country, and it is the oldest of the four. It was founded in the eighth century by the Idrissids.

1. The street plan of Fez was prepared by Professor Hassan Awad of the University of Rabat (Morocco).

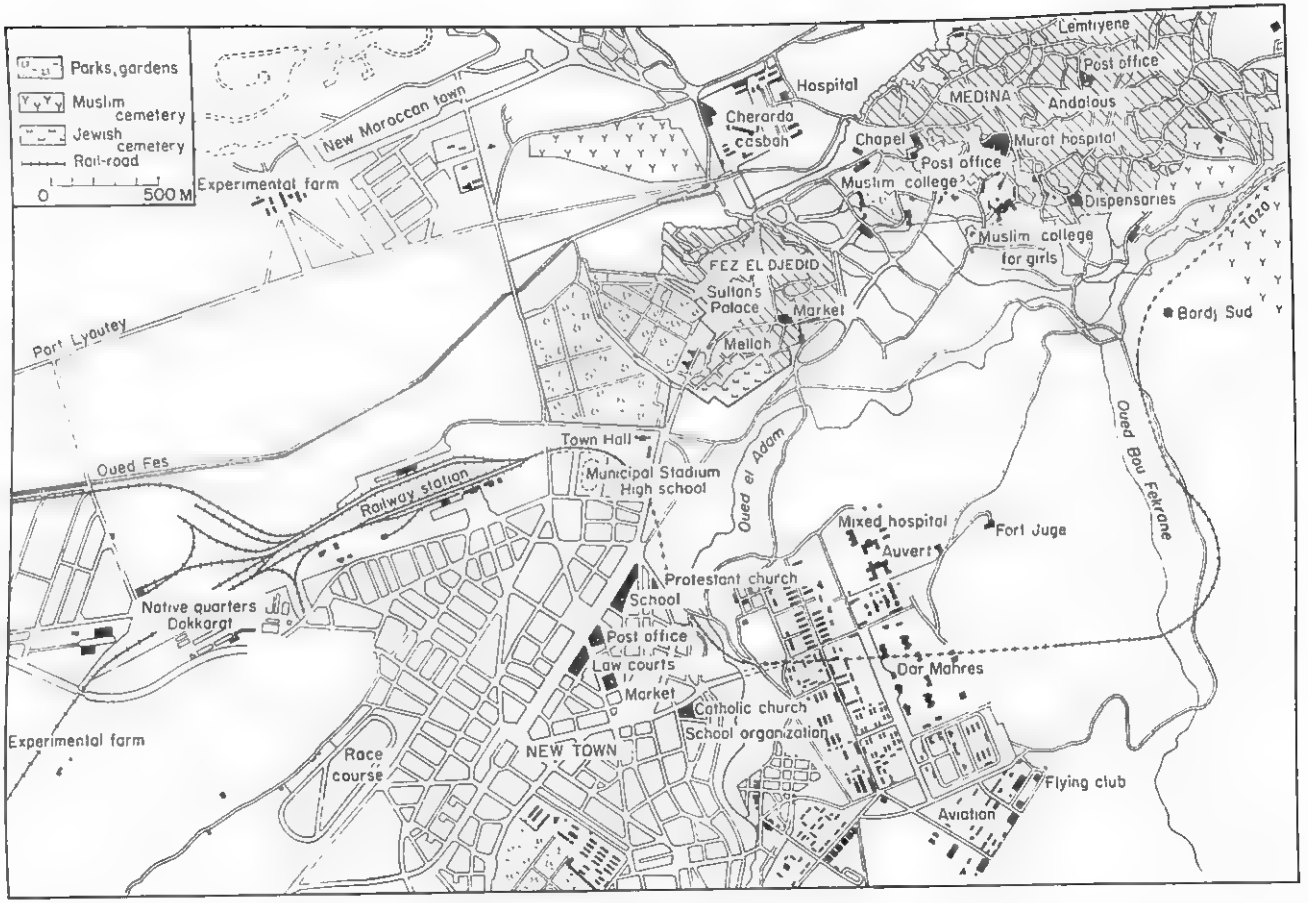


Fig. 4 Plan of Fez

1. The site

Fez is located in the rich Saïs plain and lies along the great east–west route running via Taza from the Mediterranean to the Atlantic. In a green and pleasant situation, the town stands on the banks of the Oued Fès which has been diverted to give it an abundance of the water vital to it, making it in this respect one of the country's most favoured towns, with running water, visible or invisible, everywhere.

2. The Muslim city

The foundation of the oldest part of the city straddling the Oued dates back to the Idrissid dynasty. This is Fez el Bali; beyond the Bou Jeloud Gardens lies Fez el Djedid, 'new Fez', built on the tableland by the Merenids in the thirteenth century and now the country's administrative, political and military capital. Lastly, to the south there is a large European town. Figure 4 shows these divisions, which amount to separate communities.

Fez is a typical Muslim town, walled, with its great mosque, its baths and its souks, and it has managed to preserve its character throughout its long history. In its various quarters and in the winding maze of its streets, it admirably exemplifies the distinctive features of Muslim cities and makes it possible to understand what such cities owe to Islamic civilization.

The Koran encourages the creation of cities, which are religious centres. The centre of the town is the great mosque, where the faithful come for prayers and purification. Next to it is the bazaar, where the 'noble' trades are concentrated (merchants selling wax-candles, incense and books), and there also are the souks and public baths.

3. Quarters, layout, housing

In Fez, the quarter where the sovereign resides, the *makhzen*, is in Fez el Djedid, and forms what is practically a separate township. As often happens, the Jewish quarter, the *mellah*, is next to it, and the remainder of the town consists of residential quarters (*medinas*), strictly separated, topographically (gateways and streets with dead-ends) and socially.

The streets are narrow and tortuous. There are no plazas or squares

but innumerable blind alleys, dead-ends and inner courtyards. The city streets are strictly for pedestrian traffic and pack animals.

The peculiar layout of Muslim cities is the result of a lack of municipal organization. By a process of progressive encroachment by new buildings, erected wherever the builder chooses, what was originally a straight main street can gradually change into an alleyway flanked by frontages in no sort or kind of alignment.

Muslim cities owe their special character also to the houses, modest in appearance, low-built of relatively perishable materials (rammed earth and wood) and dilapidated by the downpours of the Mediterranean climate. The ground-plan of these houses, with a series of rooms arranged around a central courtyard, infrequent windows and terrace roofs, is not specifically Islamic. This arrangement not only screens the life of the family from the gaze of the curious, but also has the merit of shielding the rooms against wind and extremes of temperature.

All Muslim towns are surrounded by a fortified wall and the cemeteries are also within the enclosure. They present a great contrast to the 'European' town with its geometrically traced streets.

4. Functions of the town

With its manifold functions, Fez long remained the most important of all the imperial capitals and its decline began only in the twentieth century, when Rabat was selected as the capital.

(*a*) *Religious function.* Fez continues, however, to play a most important part intellectually, religiously and historically, and its Qarrawyîne university, founded eleven centuries ago, is still engaged in teaching Koranic theology and Muslim law.

(*b*) *Agricultural function.* The Fassi citizens of Fez have invested their capital in the purchase of land around the city, of which they hold about half. Alongside, there are the colonists' estates where grain crops flourish.

(*c*) *Industrial function.* Industry was artisan in character and formerly provided work for one-third of the population, but is now on the decline. The guilds have vanished and the craftsmen, formerly 'lower middle class', have sunk to proletarian status. Only a few crafts are still pursued actively—leather working (tanning, shoemaking), silk (weaving) and milling, and even these are being increasingly modernized.

Conclusion: four basic principles

Geography teaching, whatever region or whatever aspect of general geography is being studied by the class, must constantly be inspired by four principles:

1. Geography is concerned essentially with visible phenomena, and describes the earth's surface in its real and present aspects. It also deals with 'invisible' factors (psychological, political, religious) in so far as they account for visible facts.
2. Geography seeks always to localize and delimit the phenomena it studies, first, because one of its tasks is to 'map' the world, and secondly, because the analysis of the location of phenomena reveals what problems have to be solved, and what are the factors that explain them.
3. Geography seeks to study with particular care the relations between phenomena, more especially between phenomena of different orders. Without adopting an attitude either for or against determinism, it analyses the interplay of reciprocal influences exerted by natural conditions and by human groups.
4. Geography must be regarded in teaching at elementary and middle level in just the same way as at higher education or research level, that is to say, as a science that is both contemporary and practical —an applied science.

3 Teaching techniques: direct observation[1]

TEACHING TECHNIQUES in geography may be simply divided into two groups:

1. Those which rely on the pupils observing directly what can be seen; as for example when a class is taken to a valley in a rural district and asked to sketch and describe the physical or cultural features they can see.
2. Those which rely on the pupils observing from secondhand material; as for example when the teacher shows a large photograph of a valley and then asks the pupils to make a simple sketch of the features shown.

Although ideally it would be best if pupils could be taught geography mainly by reference to concrete examples, in practice this is not possible, partly because only small geographical areas would be covered, and partly for reasons of school organization. Thus most geography teaching must necessarily rely on secondhand material such as maps, globes, pictures, models, films and so on. However, direct observation will be considered first, since it is essential that the child should realize that what he is asked to learn or do is concerned with an existing reality and not an abstraction.

Teaching techniques are also affected by the abilities of the pupils being taught. It is difficult to state precisely, at this stage, just how techniques are affected by pupils' abilities. In general, however, it is possible to make the following distinction:

(*a*) The abler pupils will appreciate a balanced interpretation of any geography syllabus or scheme of work. By 'balanced interpretation' is meant a method of teaching in which there is a blending of factual information with the teaching of skills and the understanding of geographical relationships. For example, an able third-year secondary school class (14-year-old pupils) could easily acquire a knowledge of facts about the water supply problem in Egypt; such a

1. Some of the ideas and schemes expounded in this chapter are due to Mr John White, Lecturer in Geography at the Northumberland College, Ponteland, Newcastle upon Tyne, and a former colleague of the writer.

class would be interested in and able to understand the relationships involved between water supply, seasonal rainfall in Ethiopia and the relief of Egypt, Sudan and Ethiopia; such a class would be able to map rainfall distribution in north-east Africa. Thus factual knowledge, geographical relationships, and geographical skills are capable of being blended together. Abler pupils will also be willing to make the effort required to assimilate such factual knowledge as may be essential to the comprehension of a problem.

(*b*) The less able pupils are less interested in the balanced approach. It is impossible, of course, to take literally the sharp dividing line which has been suggested. Much depends on the individual child, but generally, the lower the ability of the child the less is the child interested in the abstract side of a subject. For instance such a phrase as 'the influence of the permeability of the rocks on water supply as against the influence of evaporation' has little meaning and therefore little interest for him. Less able pupils on the whole think in terms of 'doing something' concretely rather than in terms of 'thinking about something' in an abstract way. Therefore, with those pupils, the 'skills' aspect of geography is more significant. They will readily draw maps, graphs, produce sketches and models. They have the satisfaction of seeing the result of their labours. Nevertheless, it is the teacher's solemn duty to help the mental development of his pupils; consequently, all practical exercises must aim at teaching the pupil to think for himself. An exercise which requires no more than the slavish reproduction of a map or model will not do much to stimulate thought. On the other hand, an exercise set in too abstract terms may have the effect of discouraging pupils whose mental development has not yet reached the stage where abstractions are easily understood.

Geography and the child's mental development

In a book of this kind it would be useful to include some guidance as to what topics in geography are suitable for particular age groups. Whilst some suggestions are made (Chapter 8), it must be admitted that precision in this matter is almost impossible to achieve, for two reasons. First, because the amount of research which has been done on this aspect of geography and education is limited, and often orientated towards finding out pupils' preferences in geography. Secondly, because understanding of geography is to some extent culturally influenced. Thus a topic such as 'irrigation problems' might be more readily understood by an Indian pupil of eleven years than

by an English pupil of the same age whose experience of irrigation would probably be nil. The very order in which the content of geography is studied is determined by the location of the homeland of the student. Consequently any suggestions which are made as to the age at which various subjects are studied must be understood as being tentative and not necessarily applicable in all areas.

At the primary stage (5 to 11 years of age) geography needs to be mainly descriptive. Children are then able and willing to observe a multitude of phenomena and may begin recording such facts in a simple way, especially pictorially (e.g. weather observations). When primary children reach the age of 8 or 9 years, they often become keen collectors, a tendency which is obviously helpful to the geography teacher, who can arrange ordered exhibitions of rocks or vegetation or samples of raw materials, with the aid of his pupils. The children's interest in all they can see around them can obviously be harnessed by the teacher. Their interest in other lands is soon gripped by stories to which they will readily listen. But, though primary school children will often amass a great deal of information and memorize it, few are able to reason adequately from those facts. Thus any attempt to introduce too intellectual a content into primary school geography is likely not to achieve its object.

It is only at the secondary stage (12 years onward) that the beginnings of scientific thought are seen. The pupils are still more interested, between 12 and 14, in descriptive geography, but gradually there develops both a need for and an ability to understand explanations of processes. For example, between the ages of 12 and 14, a boy or girl may evolve from the stage of appreciating a description of the course of a river to an understanding of the forces which have influenced the river and carved its valley. The method of approach adopted by the teacher should, however, be mainly inductive; he should present the facts and then attempt to explain them if a simple explanation or theory exists. To try to deal with a complex theory—for instance, that which attempts to reconstruct past landscapes to explain the present course of a river—may serve only to confuse pupils whose minds are not ready to deal with complex situations. The secondary school pupil is much more concerned with the reality of the present day, and the power of abstract reasoning develops very slowly. To force this development prematurely in geography may result in a distaste for the subject which it may be difficult to eradicate later. It is when the pupil is evolving through the middle stages of adolescence, from 15 to 18, that the intellectualizing process really begins. It is then that he begins to appreciate a theory critically, to compare various

explanations of a particular phenomenon and assess their merits. The degree to which this can be done will vary considerably from pupil to pupil.

The techniques of teaching advocated in this and the next chapter are, however, applicable at most stages. Thus, field work, map work, the use of pictorial material, are all techniques which can be used in the primary and in the secondary school, but each must be adapted to the individual classes of pupils with whom the teacher is dealing.

Teaching techniques based on direct observation

Field work or 'outdoor' work is now considered an essential part of any geography course, and should be included at all stages of the course. Consequently, such field work should be started as early as possible with simple exercises, to initiate children into the technique of field study. The following examples are given to illustrate some techniques of field work. They are arranged in increasing order of complexity. Although the examples are mostly taken from one country, this has been done, not for nationalistic reasons, but for the pedagogical reason that the examples are real and known to the author. The reader will adapt what is stated to his own local environment. In the next chapter, the examples used will range over a large number of territories.

Any geographical field work involves three steps—

(*a*) observing what can be seen;
(*b*) recording this on a map or in a notebook;
(*c*) interpreting what has been recorded.

Working around the school—1. One lesson

(for pupils aged 10 to 12)[1]

The first simple exercise in 'field work' might simply be one which enables the child to correlate what he can observe on the ground with what is shown on a large-scale map. An example is given in Fig. 5 which can be done in a normal lesson (40 min). It is taken from an urban setting in England, *but the same exercise might be set for any urban or rural setting, whatever the part of the world.*

1. Although the age range of pupils is given for each example, it is up to the teacher to assess how far the lesson is suitable for his particular pupils.

An outline map

Each pupil is given an outline map of the area around the school on a scale of 1/2,500 (or the nearest available scale). If no detailed map on that scale is available, as may be the case in many areas, then

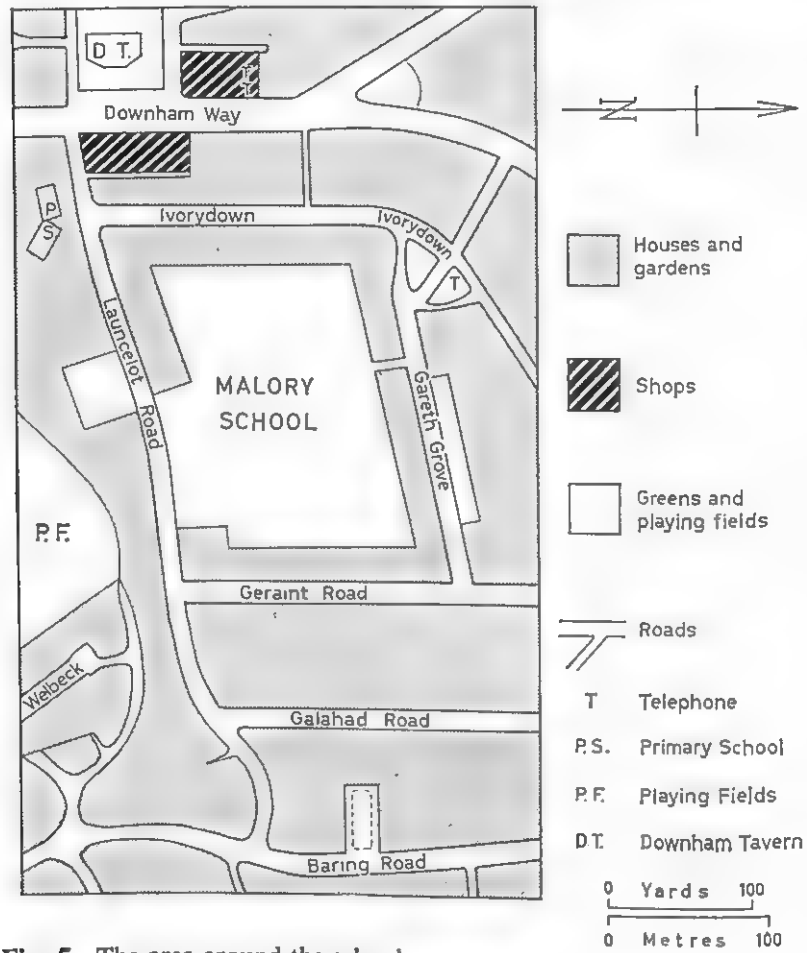


Fig. 5 The area around the school

the teacher must draw out a sketch map approximately to scale. There are several possible courses of action. If a map exists, but on a smaller scale, then the sketch map can be produced on the large scale by superimposing on the map area to be enlarged a grid of lines running north to south and east to west. The same grid but much larger in size, according to the scale required, can then be drawn on a sheet of paper. The features required on the sketch map can now be drawn on

the larger scale, the pattern of grid lines helping to guide the positioning of each feature. If no map at all is available, or if the scale of the original map is too small, then the teacher must make his own, even

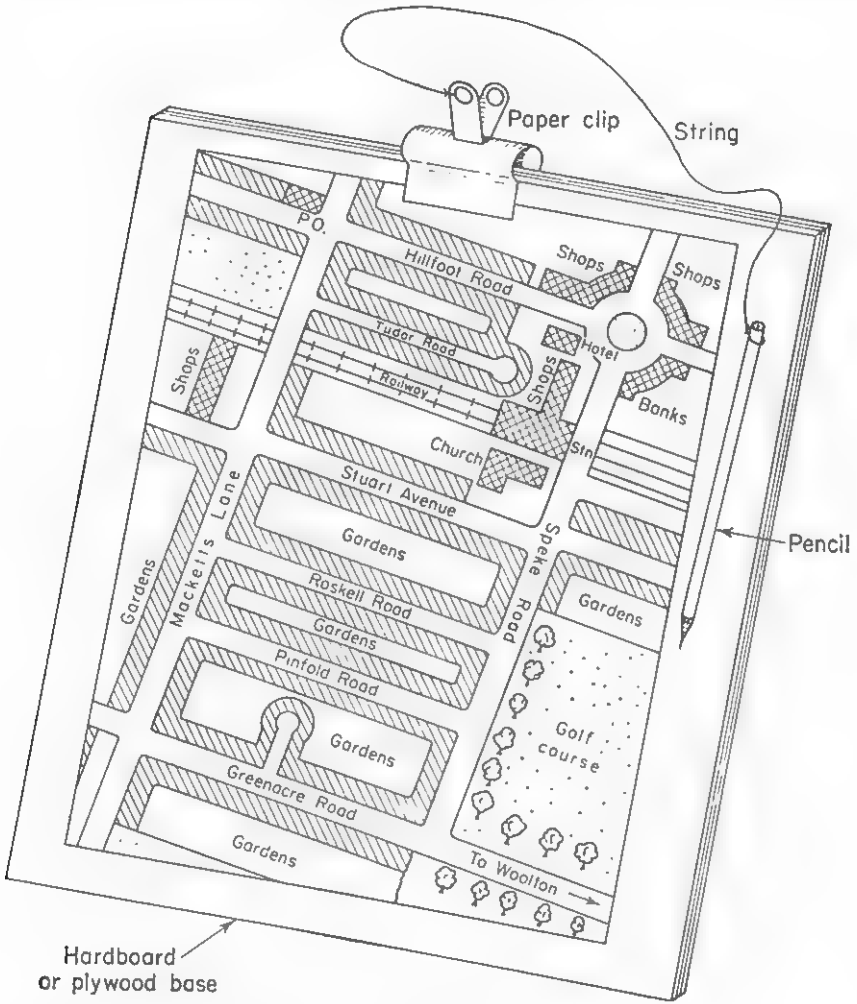


Fig. 6 How to fix a map on a portable base

by estimating length and orientation of features if necessary. Some help in the process of such sketch map making may be obtained by using a compass to determine the orientation of a wall or of a road, and by measuring at least the length of one feature, in order to facilitate the estimation of a scale. It is important to bear in mind that

for such elementary field work a great degree of accuracy in the base map used by the pupils is not required, and no teacher should be put off from drawing such a map because of his own imagined inadequacy as a cartographer. The map drawn should show the main features to be observed. For example, in Fig. 5, the roads are shown, the houses, the shops, the areas of 'green' or public lawn. As many maps will be required it is essential that some means of duplicating them be available, even if it is only a basin with jelly and hectograph ink; but of course a mechanical or electrical duplicator is more rapid. (Refer to Chapter 5.)

Work to do outside

If one map is shared between two pupils, then one pupil can concentrate on observation and the other on recording. A method of fixing the map on a firm base is shown in Fig. 6. Thus before the class is taken out of the classroom it may be told: 'I shall be leading you in pairs round the block. You will need a pencil, and it will be your job to record on your map certain things which you will see. Whenever you see a house or a block of houses, put H in the proper space on the map; for shops, put S; for "greens", put G. Name the roads along which we shall be walking.' Of course, not all pupils will find this easy, and the teacher may help those who are in difficulty as the class is walking.

Work back in classroom

When the pupils get back into the classroom, they can be given a new outline or base map each and they can make a neat copy of the map they filled in while walking. Instead of using letters, they may colour in the various parts of the map and add an appropriate key. Figure 5 shows the completed job. The teacher may then want to discuss certain aspects of the map with his pupils, depending on their abilities. For example, in relation to Fig. 5, he might discuss why all the shops are along a particular road, or why the houses are all of one type. This is the stage of interpretation.

Thus, when the exercise is completed, the pupils may have derived the following advantages:

(*a*) They have learned to orientate a map and correlate the features shown on it with those on the ground.

(*b*) They have learned something about their own district.

In a rural setting, the teacher might have asked them to map the

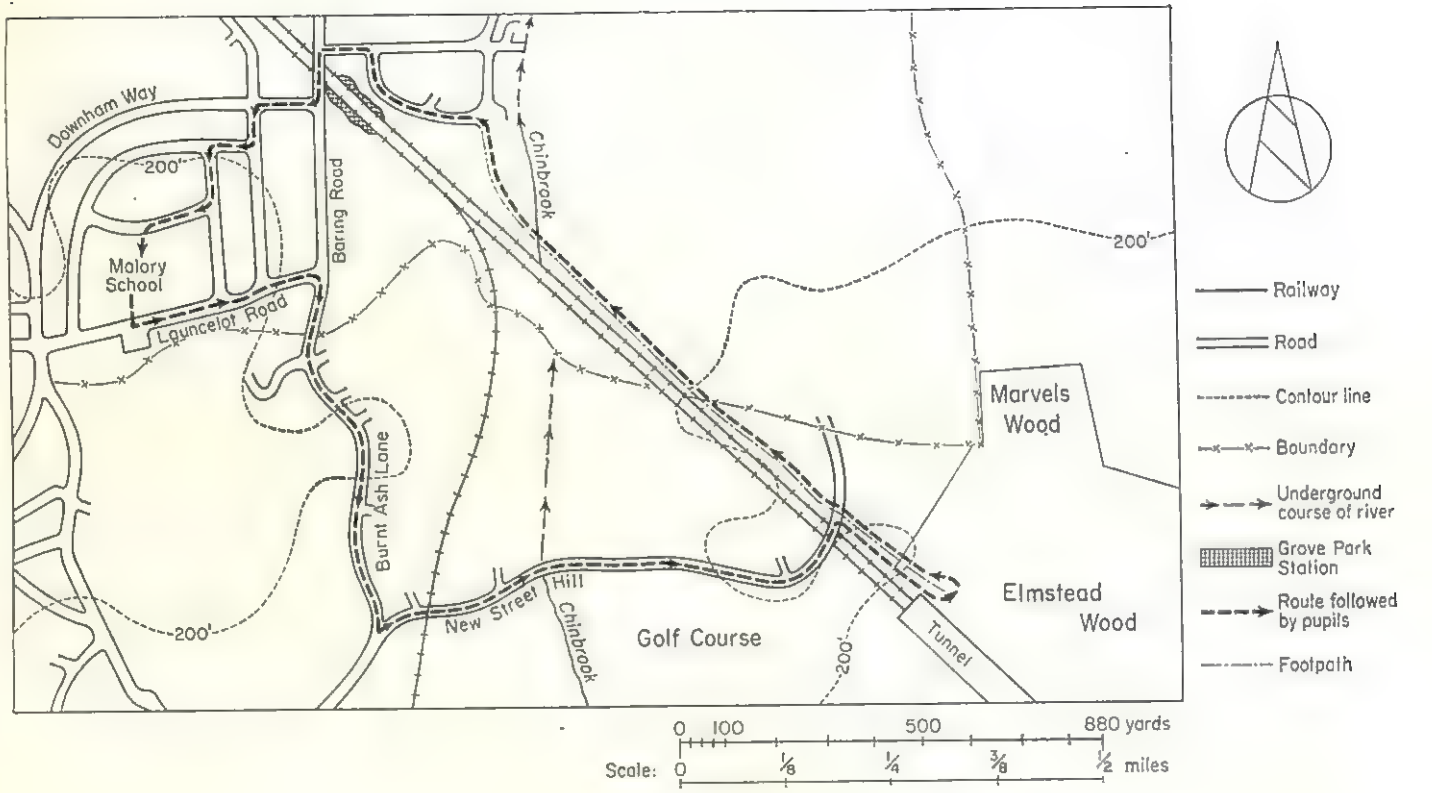


Fig. 7 Area around Grove Park

types of crops grown in the field near the school, the type of vegetation growing by the roadside, and the farmhouses, barns, and other buildings or whatever special features there are to observe.

Working around the school—2. Half a day's work

(for pupils aged 12 and 13)

Later in the course, after six months or a year (depending on school conditions), it may be possible to spend half a day on direct observation or field work. Given such time, much more work can be done. As importance is attached to the pupils' having something precise to

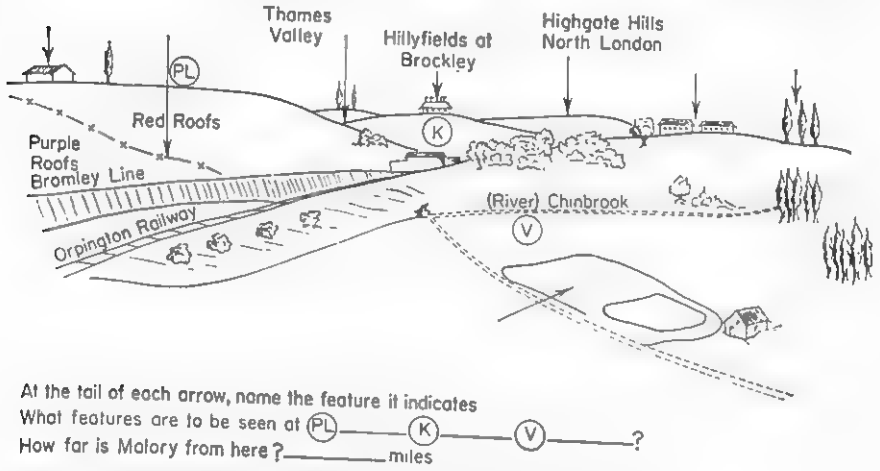


Fig. 8 Field sketch looking from Chinbrook Meadows

do, and a purpose for doing it, the suggestion is made that a map and a questionnaire be duplicated. Thus the pupils have a programme of work to carry out.

The questionnaire for an afternoon's walk (2 p.m. to 4 p.m.) from a south-east London school is printed below. Figure 7 is the map which is appropriate to it.

The route followed is shown on the map to help the reader. It is not shown on the maps given to the pupils. As may be seen from the questions, the only geographical knowledge which is assumed is that the pupils have some familiarity with contour lines. (See questions 4 and 9.) Question 11 requires some explanation. One technique of outdoor observation is to draw a sketch of the main features seen. Experience shows that many pupils do not find this an easy task to start with. Consequently it has been found valuable for the teacher to

make and duplicate a simple drawing showing by a few lines the form of a landscape, and then ask the pupils to indicate on the sketch the features he can see. An example of this is shown in Fig. 8.

For example the children would immediately recognize that the building on the left of the sketch is their own school building. It stands on a hill marked PL because it is a small plateau. Further to the right lies an isolated hill marked K (for a knoll). From the place where they are standing the pupils can see the valley (V) of the small river called the Chinbrook. So gradually they learn to look at a landscape, analyse its constituent parts, and give a name to the real physical features which they can see. A year later they may be asked to draw a simple sketch unaided.

Questionnaire for Figs. 7 and 8

LOCAL GEOGRAPHY QUESTIONNAIRE[1]

Answer all the questions in the space provided with a ball-point pen, or pencil. Map your route as you go.

1. Describe the texture of the soil in the flower-beds near the car park—what colour is the soil? Is it sandy or clayey? What stones does it contain?.....
2. As you walk along Launcelot Road—
   (*a*) in what direction are you travelling? .....
   (*b*) are the houses on both sides of the road detached, semi-detached, or terraced? Of what materials are they built?...
   .....
   (*c*) in what year were they built?.....
3. As you walk along Baring Road, what evidence can you find that you are crossing the London/Kent boundary? .....
   Put in the correct place WPF for Westminster playing field.
4. Along Burnt Ash Lane—
   (*a*) state in what general direction you are travelling.....
   (*b*) are the houses on the east side of the road detached, semi-detached, or terraced? Of what materials are they built?...
   .....
   (*c*) print in the word SPUR on the map to show the higher land you cross.
5. At the corner of Burnt Ash Lane and New Street Hill show on your map by writing the following capital letters:

1. These questions obviously apply to a given concrete case. They would have to be modified if used in a different setting.

Sundridge Garage (S.G.), Bromel Paint Factory (B.P.), site for a Public House (P.H.), Industrial Estate (I.E.).

6. At the bottom of New Street Hill, face the river—then state—
   (*a*) in what direction you are facing. .....
   (*b*) in what sort of physical feature you are standing. .....
   (*c*) what lies to the north side of the road. .....
7. Describe the soil found under the oak trees on the right-hand side of New Street Hill. .....
8. In Elmstead Woods name the trees you can see: .....
   .....
9. Print on your map in the correct place—cemetery (†), the allotments (A) and the *spur* of high land you are now crossing.
10. Along the railway cutting—
    (*a*) what sort of vegetation is growing along the railway cuttings?
    .....
    (*b*) describe the soil found along the top of the railway cutting near the recreation ground .....
11. Fill in the accompanying field sketch from the boundary gateway above Chinbrook Meadows (see Fig. 8).

Follow-up work in the classroom

When the pupils are back in the classroom after the outdoor work, it will be possible for each boy or girl to make a good copy of the map (Fig. 7), putting on it information about the area visited during the walk. For example, the map should show precisely the location of a valley, of spurs of high land, of various types of houses, of industrial works and of open spaces, as well as the route followed by the class, showing names of roads. The map could be appropriately coloured to make the various physical and cultural features of the landscape stand out.

Further, the teacher could then ask his pupils to make a brief summary in their notebooks of the information they gathered during their walk, under three headings:

(*a*) Physical features seen.
(For each feature a precise example to be given.)
(*b*) Types of houses seen.
(For each type of house a locality to be given.)
(*c*) Nature of open spaces seen.
(For each one a locality to be given.)

Then a brief conclusion on the nature of the district around the school should be written, e.g. that, in this case, it is primarily a resi-

dential area with a variety of types of houses, providing homes for different income groups, and with a good deal of parkland, woodland and a golf course.

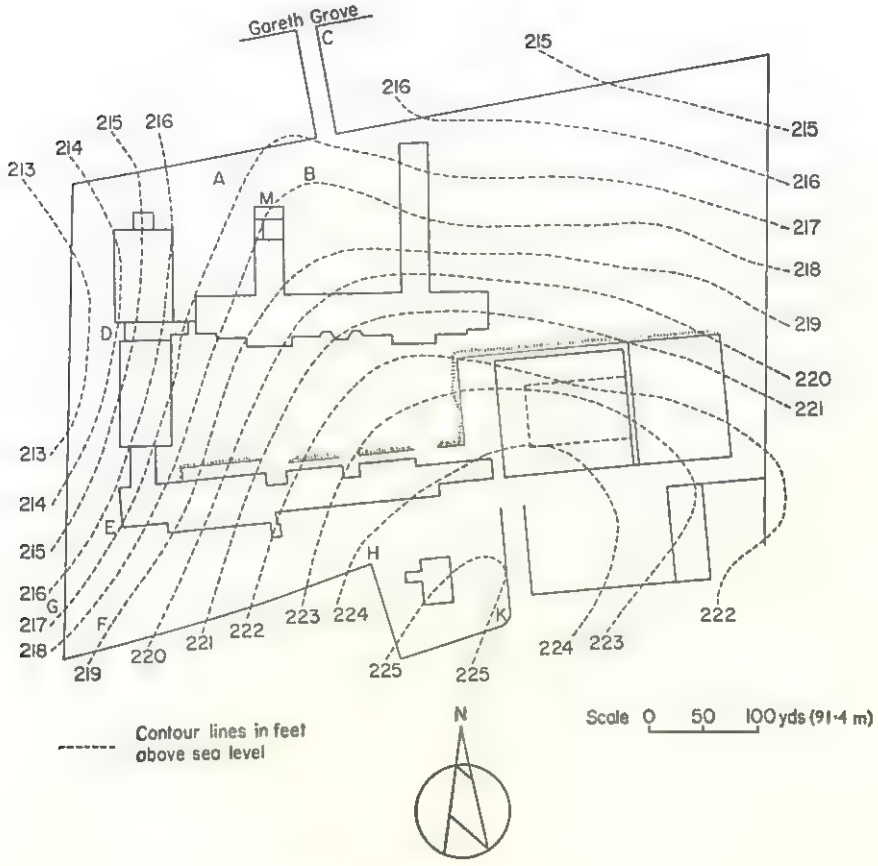


Fig. 9 General plan of Malory School

Working around the school—3. One or two lessons

(for pupils aged 14)

In an urban area it is often easier to start by going round the 'block' since roads are so easily recognizable on a large-scale map. This, however, need not be true of a rural area where roads may be far apart. Therefore the order proposed in this chapter is not necessarily to be followed. One advantage of leaving the present exercise

until pupils are in their fifteenth year is that it depends on their ability to *read* a map with contour lines accurately.

The map in Fig. 9 shows the plan of the school in which the pupils work. The contour lines are given, but no names are printed on the map. The children must learn to orientate the map correctly. It is suggested that this particular exercise is best done in pairs, but without the children being shepherded round the school grounds in any particular direction. Each pair may work in what order it likes.

The work to be done falls into two easily definable categories:

1. Naming the features (physical and human) shown on the map

(*a*) Print on the map in the correct places: teaching block, house block, technical block, assembly hall, gymnasia, schoolkeeper's house, playground, inner courtyard, car park.
(*b*) Describe the soil accurately at A. (Its colour, texture, what stones it contains.)
(*c*) What types of trees are growing at B, C, F and K?
(*d*) What type of grass is growing at D?
(*e*) Put X on your map to mark the highest point in the school grounds.
(*f*) In what direction do the school grounds slope most steeply?
(*g*) What is the difference in height between the highest and the lowest point in the school grounds?

2. Obtaining information of an economic nature about the school

The aim here is to show that, by careful observation, a good deal of 'economic geography' can be learned from the information available on the school site.

(*a*) What building material is used for the main school building?
(*b*) What roofing material has been used?
(*c*) Is the wood which forms the support for the covered ways hard or soft wood? What colour is it?
(*d*) What is used to surface the inner courtyard?
(*e*) What sort of fuel is used to heat the school boilers? What company supplies it?
(*f*) Where were the boilers made?
(*g*) Where were the drain covers made?

The first group of questions provides a useful check on whether pupils have learned to read and handle a large-scale map accurately.

The second group of questions can be used to show the link between the school and the community at large. The follow-up of this can show how the building of the school necessitated bringing materials from all parts of England and the world, and that the running of the building is no less dependent on the outside world. For example: the bricks came from the Oxford clay vale in England, the roofing material is aluminium from Canada, the cobblestone in the courtyard from the south coast of England and wood support for the covered way from West Africa. The fuel oil which heats the boilers comes from the Persian Gulf.

A map could be drawn to show the links between the school and its suppliers. All this information can be obtained on the school site. The teacher can give aid where required, and discuss the results afterwards in a subsequent lesson.

Field work in a rural area

(for pupils aged 13 to 15)

So far we have been concerned only with the type of work which might be done in the immediate vicinity of a school in a lesson or at the most in half a day. Let us now suppose that it is possible to take the children away from their normal environment and transport them to a rural area for a day or perhaps for several days. It will be necessary, of course, to plan the transport carefully and to inquire very closely into the accommodation provided for the children. Conditions will vary quite considerably from country to country, but three suggestions may perhaps be made here.

First, it is more convenient to travel by private motor coach than by railway. This enables the teacher to plan the route taken and to organize stops where these are important for convenience and for geographical reasons; and the children are more easily controlled from within a motor coach than on a train. It may be desirable, if the party is staying in a district for a week, to keep the coach in the area so that the children may be taken to (geographically speaking) strategic points, without trouble or waste of time. The coach should not, however, be used as a classroom on wheels. If the children are merely going to sit in the coach and listen to the teacher talk, then they might as well stay in school.

Secondly, the accommodation used must include a room where the pupils can work quietly, and where, if necessary, the teacher can go over some of the work to be done (a chalkboard is useful).

Thirdly, it is essential that the work to be done should be well prepared beforehand. The teacher must be absolutely clear as to what he wants to do and as to the purpose of the exercise. This means that the teacher must know the area well.

As in every other aspect of school life, it is necessary to engender an atmosphere of work. It must be made clear to the pupils that geographical field work is just one aspect of school work. Nothing is more frustrating and time wasting than to take out a party of children on field work if they regard the proceedings as a holiday outing. On the other hand nothing is more satisfactory than to see the results of carefully carried out field work. But this requires hard work, endurance, persistence on the part of the pupils and constant strong leadership and encouragement on the part of the teacher. For the teacher who is just embarking on 'field work' as a new venture, it will be best if he or she starts by a very simple piece of work lasting perhaps only one lesson, but making sure that the pupils can be kept busy during the whole of that period. The teacher can then work up to more ambitious field work as confidence in the technique is gained.

'LAND USE' SURVEYS

The land use survey in a rural area is a means of obtaining a picture of the kind of agriculture practised in the area and its relationship with geographical conditions. It is as well to start in an area which is simple to deal with, that is, one where the fields' boundaries are fairly clear, where the fields are not too small or too large, so that in about two hours it is possible for a 13-year-old pupil to cover the area designated. Once again, in certain areas of the world no accurate map may be available, in which case the teacher may have to make his own. Should this be necessary, then the map would probably have to be much simpler than that shown in Fig. 11. Such a map should simply show the boundaries of the fields or strips on either side of a road or track, along which the pupils may walk while noting down the features of land use. Again it is necessary to emphasize that the degree of accuracy required in the shape of the fields is not such as to require special cartographical techniques—a clear sketch map is the only requirement. Indeed if the drawing of a sketch map should prove too difficult because of particular local conditions, then a simple compass traverse line may be drawn. This could simply consist of a double or single line showing the road or track along which the pupils are walking. At intervals along the double line an arrow could be inserted to indicate a feature to be observed and recorded, as shown in Fig. 10.

The pupils could then insert, by the arrow, the feature which they had observed. This method is applicable, of course, to other observations than those of land use, and in its simplest form may be used with primary school children from the age of 8 upwards.

In making the initial compass traverse, the teacher might enlist the services of two senior pupils. The two students could be measuring distances with a surveyor's chain and taking compass bearings, while the teacher could be writing down in a notebook the distances and bearings, as well as the significant features of land use.[1]

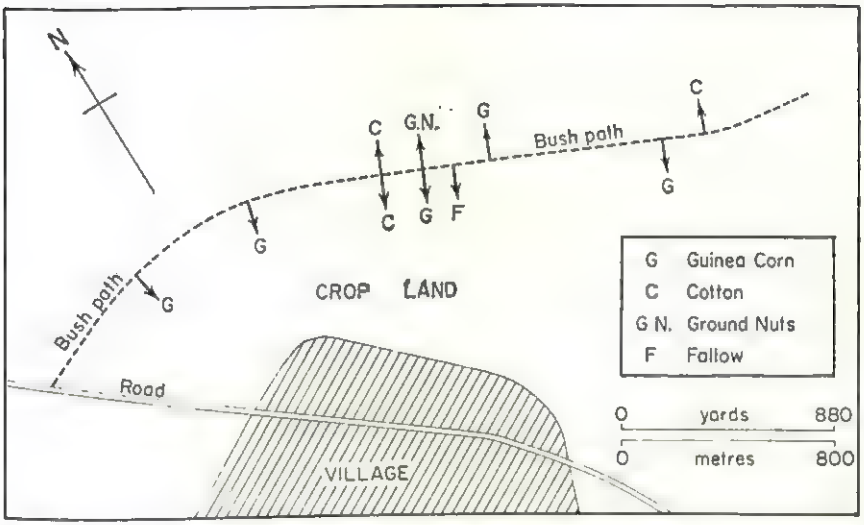


Fig. 10 Crop distribution along a bush path north-east of Soba (Northern Nigeria)

The teacher may be helped in his task of map drawing if his government possesses a stock of aerial photographs of the district he is working in. He may be able to borrow a number of photographs which will enable him to draw a sketch map showing the boundaries of areas of different land use.

The map in Fig. 11 is based on a 6 inch to one mile map of the North Downs area in Kent, England. It shows woodland and the boundaries of fields, footpaths and roads, dwelling houses, other buildings and an occasional spot height.

In this particular case the pupils were told to walk from X in the

1. Details of land use surveys and field work carried out in areas where no suitable maps are available may be found in articles by: G. D. Watson: 'An account of field work in the teaching of geography', *The Nigerian Geographical Journal*, Dec. 1957, pp. 38–43; and D. Williamson: 'Land use surveys at Bunumbu (Sierra Leone) and Cape Coast (Ghana)', *Bulletin of the Ghana Geographical Association*, Jan. 1960, pp. 13–20.

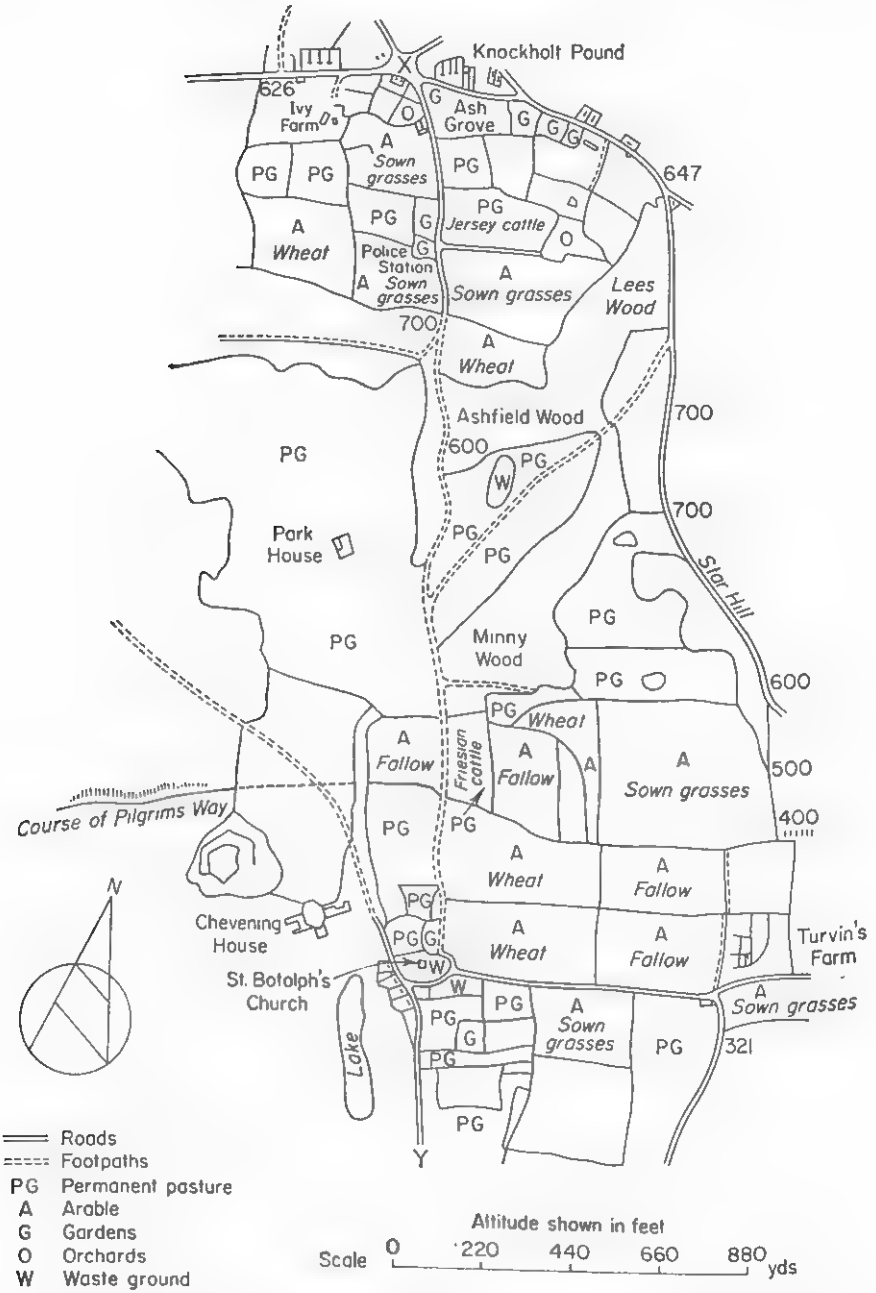


Fig. 11 Field work: North Downs. Land use map. Knockholt to Chevening

north to Y in the south, a distance of not quite one mile. They were asked to locate each field shown on the map and to note the use to which the land was put on the outline map given to them (one map for two pupils).

The method of notation used in Fig. 11 would not be suitable for every area in the world. Land use might even be so uniform in certain areas that a land use survey would yield little valuable information. It should therefore be borne in mind that the method of classification used is designed for English conditions and that the map is reproduced here for guidance rather than imitation.

1. A field which had been ploughed and in which crops were growing, or which was fallow, or in which sown grasses were being grown, was deemed arable land and a letter A placed in that field. If it was possible to tell what was being grown, then the name of the crop was printed into the space on the map, e.g. wheat. Thus in West Africa such an arable field or plot might be planted with cassava, or maize, or yams, or groundnuts.
2. A field which had obviously not been ploughed recently and in which grasses were growing was deemed to be permanent pasture and the letters PG printed in the appropriate spaces.
3. A field which was invaded mainly by plants other than grass, e.g. heather, bracken, gorse bushes, broom, was deemed heathland or moorland and the letter H printed in the appropriate space. In other continents than Europe, this sort of land might be called bushland, that is land in which small plants and bushes grow naturally and where the hand of man is not much in evidence. In certain lands, special classification would be required, e.g. M for maquis in Corsica.
4. Small gardens and orchards were marked on the map with the letters G and O respectively.
5. Land which for various reasons was not used for farming or pasture, and could not be called heathland, was called wasteland and denoted on the map by W. For example a disused quarry would be classified under this heading.

It is most important to realize that such a classification may not be valid, say, in Central India or in Brazil. It may be necessary to add a number of groups, for example to include forest, and regenerated forest. Each teacher must work according to the possibilities of his district. Thus in some areas and with primary school pupils, it may be necessary to limit the number of classifications to:

1. Cropland—i.e. land on which crops are growing in the growing season.

2. Pasture land—i.e. land used to graze animals.
3. Woodland or forest.
4. Land not in use for cropland, pasture or forest.[1]

If a small area of cropland is visited, then the classification may be:

(*a*) Cash crops (crops sold for cash) (name each crop).
(*b*) Home food crops (name each crop).
(*c*) Fallow land.

The resulting map will have proved valuable not only in training the pupil to observe and record facts carefully, but also in bringing to light certain geographical relationships. For example, in Fig. 11 the central part, which is mainly wooded or under permanent grass, corresponds to the steep scarp slope of the North Downs in England; the arable area in the south is on the lower chalk bench at the foot of the scarp, an area of level land with fairly good soils easy to plough, while the area in the extreme north which is either under permanent pasture or under sown grasses is an area where the dip slope of the chalk is covered with rather heavy 'clay with flint' soils. The pupils should then begin to realize the relationship between land use and relief and soils. Further, it will also show them that in reality relief and soil alone *do not determine* the land use; that other factors not always in evidence intervene in various cases. When the children get back to their classroom and workroom they can not only make a good copy of the land use map, but they can also write a short account of the geographical factors influencing land use in the area. It is here that the teacher can guide them in their interpretation of the land-use pattern, and point out the importance of understanding the geographical relationships involved. He must make his pupils feel that the exercise is really worth while.

FARM SURVEYS

It is always useful to make a study of a particular farm or holding. An intensive study of a farm is a useful corrective to vague generalizations sometimes found in textbooks about 'mixed farming', or 'arable farming', or about 'wheat being grown in the Paris Basin' or 'rubber being grown in Malaya' or 'tea on the hills of north-east India'. The study of a farm not only brings reality to the pupil's conception of farming, but it also shows him or her the complexities of farming and farm organization.

1. For details of a scheme used in Nigeria, see R. M. Prothero: 'Land use at Soba, Zaria Province, Northern Nigeria', *Economic Geography*, vol. 35, no. 1, Jan. 1957, pp. 72–86.

As in all 'field work' it is important that as much information as possible should be derived from direct observation. Thus, whilst it is vitally important to contact the farmer and ask his permission for a small party to visit his farm (not more than six, otherwise the party is unwieldy), it is also important to ask the farmer only for the sort of information which the pupils cannot obtain by direct observation. This is a delicate point as some farmers may wish to carry out a 'conducted tour' of a farm of which they may justifiably feel proud. The danger, as always, is that pupils may simply amass verbal information about the farm.

The best way to get the children to work on this survey is to present them with a series of questions and/or tasks to do, as shown in the following list:

Farm study

1. Describe the position of the farm in the district.
2. From a distance, and preferably from a high point, make a sketch of the farm and its buildings.
3. Draw a rough plan to show the layout of the farm buildings, indicating what each building is used for. Put in an arrow on your plan to indicate north.
4. Try to find if there is a date on the building to indicate when it was built.
5. How does the farmer obtain his water? Is there a piped water supply? Does he have a well? Does he get it from the local river?
6. Does he need water for his crops or animals, or only for his family needs?

The following questions may require the help of the farmer:

7. What is the size or area of the farm or holding? (If possible make a rough map of the farm.)
8. What crops are grown, if any? Is there a regular crop rotation? If so, what is that rotation? Is shifting cultivation practised? If so, how long is a plot of land in use?
9. What animals are kept on the farm? For what purpose are these animals kept?
10. How many people work on the farm?
11. What machinery if any is used on the farm?
12. How does the farmer dispose of his produce? Where does he sell it?

The answers to these questions and the maps, plans and sketches will provide a compact and useful study which will give the pupils an understanding of farming and a standard of comparison when next they read or hear about farming. Since various groups of pupils will have visited different farms, it will be possible for them to compare the various types of farms and farming found in the area under study. Subsequently the sum of all the information gathered should provide material for an assessment by teacher and pupils of—

(*a*) the general nature of farming in the area studied, e.g. mainly dairy farming;
(*b*) the geographical and economic factors which have influenced this farming, e.g. the influence of soil, humidity, communications, nearby urban areas, etc.;
(*c*) the problems faced by farmers, e.g. soil erosion, irrigation, drainage, crop failures, markets, etc.

VILLAGE SURVEYS

Just as a farm survey can yield valuable information for the pupil, so the study of a village may reveal aspects of the village life and economy which are not evident to the casual observer. For instance a sleepy old-world village in a rural setting, which was once investigated by the writer, proved to be mainly the dormitory of industrial workers. After the survey has been made, the type of village and the function of the village can be discussed. As in the case of the farm survey, it is best if the class is split into small groups of about six pupils, each group investigating a different village; if this is not possible, then each group may investigate the same village, but at different times.

A map of the village should be provided showing the roads, footpaths, tracks and the buildings as shown in Fig. 12.

If such a map can be traced from a large-scale published map, all the better; but once again, if no suitable map is available, the teacher may have to make his own, perhaps with the help of his pupils, or he may have to enlarge a very small-scale map.

The teacher should not be deterred by the fact that his geographical techniques may be very primitive. A map, however rough, is better than no map at all. If the village is too big for an amateur to make any sort of map, then the solution is for him to map only part of the village. This will make the task easier for both teacher and pupils.

The work to be done might include the following tasks:

(1) An attempt should be made to classify the buildings in the village in the following categories:

(*a*) Dwelling houses (D).
(*b*) Commercial buildings, e.g. shops, cafés, hotels (C).
(*c*) Industrial buildings, e.g. smithies, garages, small workshops (I).
(*d*) Community buildings, e.g. mosques, temples, churches, church halls, meeting halls (A).

The letters could be put on the map in the appropriate places.

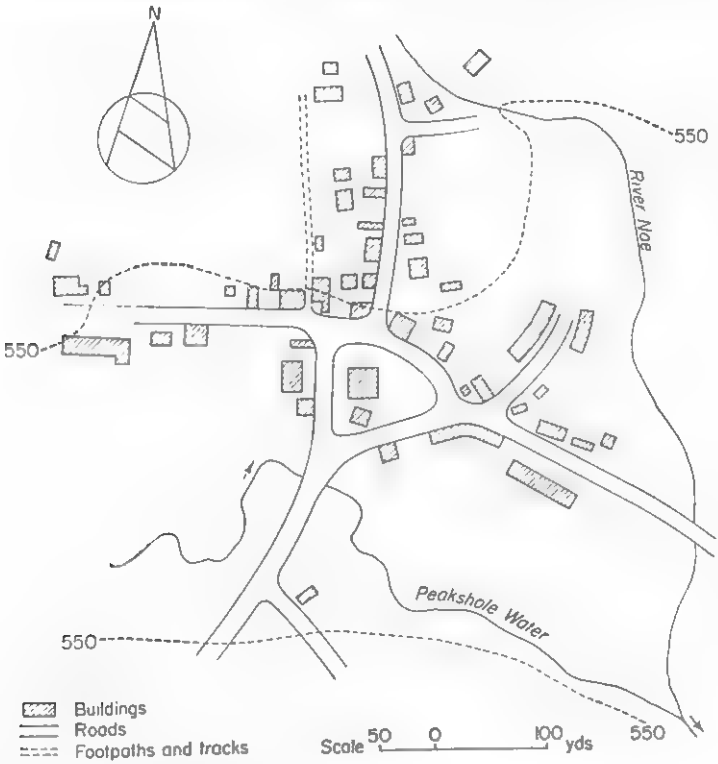


Fig. 12 Hope, Derbyshire I

(2) Information about the position of the village and its communications should be noted; for example the following questions might be asked:

(*a*) Is the village on a main road? Is there a bus service? If so, how frequent is it? To what town does it link the village?
(*b*) Has the village a railway station? If so, on what line is it? How frequent is the train service?

(*c*) Is the village along a waterway? Describe its harbour, if any. Is there a regular or occasional boat service? Is the service mainly for passengers or goods? Between which places do the boats ply?

(*d*) Is the village situated on a hill or in a river valley? Draw a sketch map to show the position of the village in the surrounding country.

(3) An attempt should be made to find out of what materials the buildings in the village are constructed, whether these materials are available locally and if so where. A sketch of a typical house should be drawn.

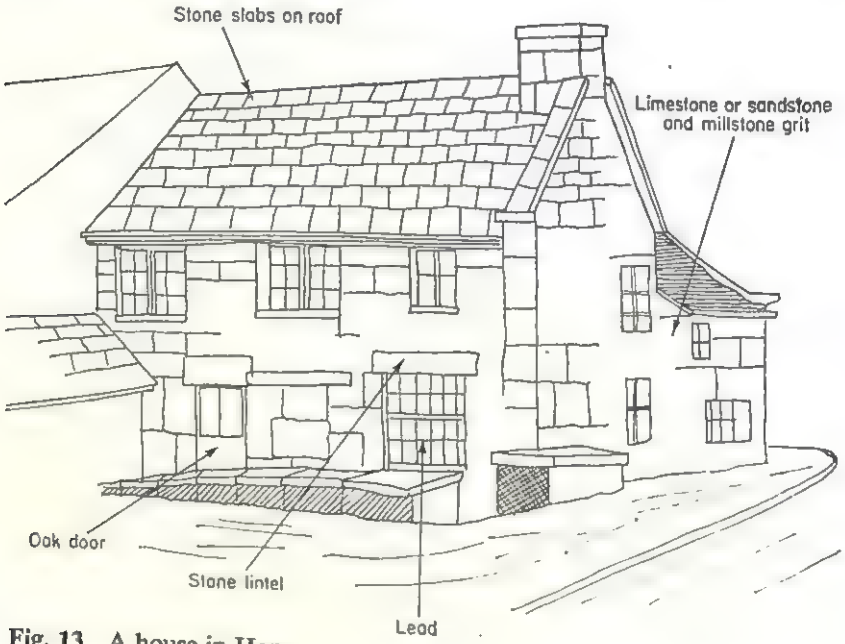


Fig. 13 A house in Hope

(4) The commercial and industrial buildings in the village should be classified—a list might read as follows:

> One drugstore, three confectioners, one baker, one hairdresser, one post office, one railway or bus depot, two garages and one agricultural machinery repair workshop.

(5) The occupations and the number of the inhabitants should be found out. This information may be obtained from the local post office, or by direct door-to-door inquiry if the village is very small. It should be noted here that when obtained verbally such information is likely to be only very approximate.

(6) An estimate should be made as to whether the village is a grow-

ing or decreasing community. This may be gauged by whether new buildings are being or have recently been constructed, whether the greens, gardens etc. are well kept, whether there is much abandoned property or not.

Figures 13 and 14 show a sketch and a map made by 13-year-old

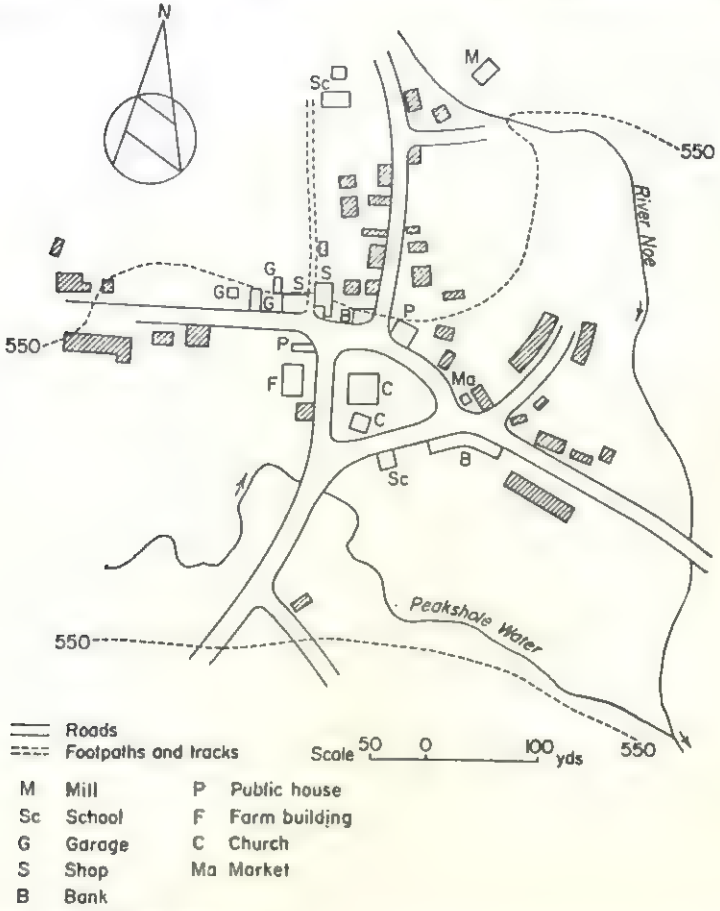


Fig. 14 Hope, Derbyshire II

pupils who investigated the village of Hope in Derbyshire, England. There is nothing elaborate about these two illustrations, but they give essential information.

FACTORY OR WORKS VISIT

One must be conscious all the time that the aim to be achieved is to give the pupil a 'geographical outlook', that is, a way of looking at

the world which answers the question: 'What geographical factors have influenced this result?' It follows from this that certain types of industrial visits are likely to be more rewarding geographically than others. For example, the study of the site of an iron and steel works is probably more useful geographically than the study of a factory making buttons. For the schoolchild, a more obvious example of the geographical factors which influence industrial locations should be chosen. Of course, a limit is set to what the teacher can choose by the nature of the locality and its industries.

Needless to say an industrial visit requires as careful planning as any other visit or survey. Permission to visit the factory will be required and arrangements made for splitting the party into groups. Most big works supply guides and these will tend to talk about processes rather than about aspects which will more truly interest the geographer. It may be possible to arrange with the management a special tour in which geographical aspects are covered. If this is not possible, as may well be the case, the best safeguard is to arm the pupils with a series of relevant questions.

The sort of questions asked will vary with the industry which is being examined, but the following give a rough guide:

(1) What are the main raw materials used in the industry?
(2) Where do these raw materials come from?
(3) What methods of transport are used (*a*) for the raw materials; (*b*) for the finished product?
(4) What is the source of power used in the industry?
(5) How large is the labour force?
(6) Where do the workers live?
(7) How large is the site on which the factory is built?
(8) When was the site acquired and how long has the industry been operating on its present site?
(9) If the industry was located elsewhere before, why did it move to its present site?
(10) Is the industry expanding or contracting?

From the answers to these questions it may be possible for analysis to be made of the geographical factors influencing industrial location. To complete their records the pupils might be asked to draw a sketch map showing the position of the factory in relation to its sources of: power, raw materials, labour, and markets (see Fig. 15).

OTHER TYPES OF FIELD WORK

The suggestions made above do not by any means exhaust the possibilities offered by 'field work'. It may suffice to mention a few more and the teacher may, according to the resources of the area in which he is working, choose those which he deems most suitable.

(*a*) An alternative to an intensive study of a particular industry is to carry out an industrial survey of a small town. This is probably less suitable for younger children than the factory visit, but quite feasible with students of 16 to 18 years of age. The aim should be

Fig. 15 The position of the Ford Motor Works, Dagenham, England

to see if there is any pattern about the industrial development of any particular town. This again is work which can be carried out in teams.

(*b*) It may be interesting to make a study of a particular river in so far as this illustrates processes of physical geography and the resultant morphology. If such a study is made, it will be more convenient to choose a small stream rather than a large river. The work which might be done is as follows:

(1) Attempt to measure the speed of the water in the river over a measured distance, e.g. by dropping a small piece of wood and timing its progress downstream.
(2) Estimate the sort of load which the river is carrying, e.g. 'it is carrying clay or sand, or pebbles or boulders'.
(3) Attempt to measure the gradient of the river.

(4) Make a careful annotated sketch map of a short stretch of the river showing the characteristic features of its banks.

(*c*) It may be appropriate to study the landscape of a particular rock type in a given area, e.g. the landscape of a limestone area. This might well start by a visit to a limestone quarry or to a bare rock exposure. There the characteristics of the rock could be brought out: whether it is relatively soft or hard, whether it is jointed, its porosity, whether it contains many fossils, the nature of the bedding. Then the nature of the landscape might be analysed in various selected areas, e.g. the shape of the valleys, the steepness of slopes, the amount of vegetation cover. It is here that annotated 'field sketches' are particularly useful (see Fig. 16).

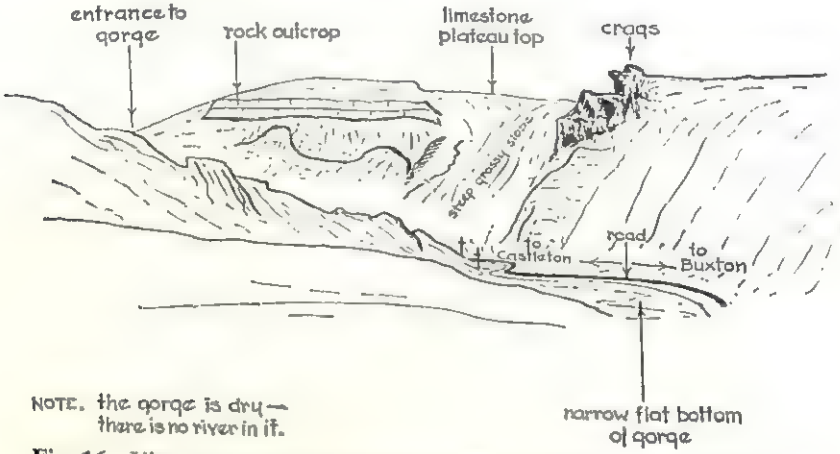


Fig. 16 View across the 'Winnatts' Gorge looking towards the S.W.

These are the pupil's record of what he or she has learned about the landscape.

It is perhaps needless to point out that lessons on rocks must necessarily form part of a school course in geography from the very beginning. At the primary school, simple observations on the colour, texture and elementary properties of certain rocks can be made. Later lessons may be adapted to fit in with the special topics being considered in each year. For example sedimentary rocks might be studied when dealing with the plain of the Ganges in India, igneous rocks when dealing with the Deccan area, and metamorphic rocks when considering a shield area such as that of Canada. But field work gives a unique opportunity of studying the effect of an underlying rock on the physical and cultural landscape of a given area.

Field work in an urban area

(for pupils aged 12 to 16)

Outdoor work in an urban area was mentioned in the examples 'Working around the School—1 and 2' earlier in this chapter. In essence field work in an urban area is concerned with applying the techniques of direct observation to what is significant in a town landscape. Since the physical landscape may, to a large extent, be obscured by the cultural features on it, inevitably it is with aspects of economic and human geography that such outdoor work is mostly concerned. In this section a few simple exercises will be suggested.

Survey of buildings

As a beginning, 12-year-old pupils could simply plot on a base map the types of building to be found in a particular road where there is a variety of buildings. The following classifications could be used: houses, shops, offices, industrial buildings, community buildings (e.g. churches, mosques, clubs, meeting halls).

An older group of 14-year-old pupils could carry out the same exercise for a much bigger area, for example two or three blocks of buildings.

As far as possible, it is advisable to avoid areas of high buildings, different storeys of which may have different uses. The complication thus introduced in the mapping process would make the exercise difficult for children of 12 to 14 years of age.

When the maps have been reproduced neatly in the classroom, the teacher's task of helping the pupils to evaluate the information on the map begins. The sort of questions which the teacher must help his pupils to answer would include, for example:

(*a*) Are the shops mainly in one area? Are they mainly in one street? Why are the shops congregated in one area? Are they near a means of transport? Are they on a main street?

(*b*) Are the offices scattered or concentrated in one area? Where are they in relation to the shops and the industrial buildings? If they are near the shops and industrial buildings, is there any reason for this?

(*c*) Where are the industrial buildings in relation to the means of transport?

(*d*) In what position are the main community buildings? Are they in a central position, and if so why?

By persistently asking relevant questions, the teacher can get his class to see some of the geographical relationships which are manifest in the urban area in which his pupils have worked.

More detailed urban land use studies

With pupils of 15 to 18 years of age it may be possible to extend this type of work to investigate slightly more complex relationships. For example, several types of industrial buildings, shops and offices could be distinguished. Shops and offices might be divided into:

(*a*) Food and drink shops, clothing shops, household goods shops.
(*b*) Multiple stores (selling all kinds of goods).
(*c*) Banks, insurance offices, transport offices, industrial offices (offices associated with factories).

Once again, it needs to be emphasized that the teacher must use a classification which is suited to the neighbourhood where the work is to be carried out. In some areas there may be no industrial buildings at all.

If this work is carried out gradually over a long period by a group of older pupils (16 to 18 years), it may be possible to obtain a map of the distribution of industrial, commercial and residential areas in a small town. From this map the teacher may suggest the division of the town into 'functional zones'. He may be able to point out certain zones where industry is dominant, others where commercial buildings are more in evidence and yet others where administrative or residential buildings are more numerous. The next step for the teacher is to seek an explanation for this zoning within the town. It is here that history and geography may often intermingle, since the explanation of the zoning must take into account the way in which the town has grown. It may be, for instance, that the administrative centre has developed around the court of an ancient monarchy. The commercial centre may be at the focal point of a number of roads. The industrial area may be close to the docks where raw materials may be imported and finished goods exported.

For a precise example of a town divided into zones, the reader is asked to refer to the lesson on Fez in relation to Fig. 4, Chapter 2.

Varied distribution studies

(for pupils aged 14 to 16)

If a large area can be covered then it may be possible to plot the distribution of specific features. The distribution of recreation

grounds, of wasteland (unused land), of parks, might yield some useful information, since it might be possible to correlate the distribution of wasteland with distance from the city centre, there being far more wasteland away from the city centre than near it. Elementary maps showing density of population can be drawn for certain streets in the neighbourhood. Children usually know how many people live in the houses in their own street. By using a dot to represent one person, they can plot on a map of their road, showing the position of each house, the distribution of the local population. After the area covered by the road and the houses has been calculated, the approximate population density in that road can be worked out. This then makes possible a useful comparison with other figures of population density quoted in textbooks.

Transport[1]

(for pupils aged 12 to 16)

The density of the transport network is greater in a town than outside it. Consequently there is an opportunity to study:

(*a*) The nature of the transport system; whether roads are more important than railways or waterways for surface transport.
(*b*) The type and frequency of the traffic on each transport system, that is whether passenger traffic is more important than goods traffic.
(*c*) What types of goods are carried by goods vehicles, and their destination.

How this is done will depend very much on local traffic conditions. For road transport a simple method comes to mind. If it is known that goods vehicles normally start from a given point, then an observer can be stationed there with a notebook to take down details of the cargoes and their destinations. Later this information may be used to draw a graph showing the frequency at which certain goods leave this given point. It may also be possible, if the information is available, to plot on a map the destination of the cargoes carried, thereby showing the links between the source of and markets for certain goods.

1. For information on traffic surveys, see *Handbook of Geographical Field Work*, Surrey Field Work Society, Surrey County Council, 1963.

Weather study

(for pupils aged 10 to 16)

Just as important as the observation of scenery is the observation of the weather. This type of observation falls into two parts:

(*a*) Observations which can give results without the use of instruments, e.g. types of clouds, wind direction.
(*b*) Observations which require the use of instruments, e.g. the measurement of temperature, rainfall, barometric pressure and relative humidity.

Observations not requiring instruments

This sort of observation is eminently suitable for children in primary schools from the age of 7 onwards, since no handling of complicated instruments is required. At the most elementary level, 7- to 9-year-old children can simply be asked to note whether the sun is shining, whether the sky is overcast, whether rain fell during the day, whether the weather remained stable or was changeable. From 10 years upwards, pupils may be asked to make more detailed observations as suggested below.

(*a*) *Wind direction*

Granted that the cardinal points are known in relation to the school building or school grounds, then the direction of the wind can be estimated by observing the way smoke is blowing from a nearby chimney, or by the way a flag or piece of ribbon is flowing in the wind when fixed to a high pole. Perhaps a nearby steeple or high building may have a wind vane, in which case the task will be simpler. At the school stage, it would seem unnecessary to attempt to distinguish more categories than north, north-east, east, south-east, south, south-west, west, north-west.

(*b*) *Wind speed*

Ideally this may be measured by an anemometer, but few schools may be able to afford such an instrument. A rough guide to wind speed is that suggested by the Meteorological Glossary of the British Meteorological Office. *Again it is necessary for the last column to be adapted in wording according to local conditions.*

A SIMPLIFIED WIND SCALE

Beaufort number of wind force	*Wind speed 33 ft above ground level in m.p.h. (or km/hour) approx.*	*Description of wind in weather forecast*	*Noticeable effect of wind on land*
0	1 (less than 1·6)	calm	smoke rises vertically
1	1–3 (1·6–5)	light	direction shown by smoke drift
2	4–7 (6–11)	light	wind felt on face, leaves rustle, wind vanes move
3	8–12 (12–19)	light	leaves and twigs in motion, wind extends a light flag
4	13–18 (20–29)	moderate	raises dust and loose pages and moves small branches
5	19–24 (30–38)	fresh	small trees in leaf begin to sway
6	25–31 (39–50)	strong	large branches begin to move. Telephone wires whistle
7	32–38 (51–61)	strong	whole trees in motion
8	39–46 (62–74)	gale	twigs break off—progress generally impeded
9	47–54 (75–86)	gale	slight structural damage occurs. Chimney pots removed
10	55-63 (87–101)	strong gale	trees uprooted—considerable structural damage
11	64–75 (102–120)	strong gale	damage is widespread
12	above 75 (above 120)		country-side devastated. Winds of this force only encountered in tropical revolving storms

(*c*) *Clouds*

Two things have to be done under this heading. First, the teacher must get the pupils to associate a name with each type of cloud so that children come to recognize cirrus, stratus, cumulus and nimbus clouds easily (13 to 14 years). Secondly, the children must be taught to estimate what proportion of a sky is cloud-covered. At a later stage, pupils can be led to understand the relationships between cloud types and different weather conditions (15 years and older).

Observations requiring instruments

(for pupils aged 14 to 16)[1]

If the school has adequate funds at its disposal, then the best course for the geography teacher is to order from a reputable firm a Stevenson screen for housing the thermometers; a maximum and a minimum thermometer; possibly a wet and a dry bulb thermometer to measure humidity.

A Stevenson screen or thermometer screen is a box with double-louvred sides. This allows the air to circulate freely through the screen and around the thermometers, and yet keeps the thermometers in the shade. The bottom of the screen should stand on four legs about 1 metre (or about 3 ft 3 in) from the ground level in an exposed position, away from buildings and trees. One side of the box should open outwards to enable readings to be taken from time to time (see Fig. 17). The side which opens should be exposed to the north in the northern hemisphere and to the south in the southern hemisphere, to avoid the effects of the sun shining on the instruments while readings are being taken.

A barometer and a rain gauge may also be purchased. These will enable accurate measurements to be taken of air temperature, air humidity, air pressure, and daily rainfall. If it is not possible to buy all this equipment, then only the maximum and minimum thermometers need be purchased. The Stevenson screen can probably be made in the school woodwork shop, or even at home by keen pupils, as can a crude form of rain gauge. Some firms supply the parts from which the Stevenson screen may be assembled.[2]

All this equipment will be of no avail unless the teacher gets the pupils to participate in the recording of the information obtained from these instruments.

1. For description of weather instruments which can be made simply in the school see *Source book for science teaching*, Paris, Unesco, 1962, pp. 92–101.
2. C. F. Casella & Co. Ltd, Regent House, Britannia Walk, London, N.1.

According to the possibilities of the school two procedures may be adopted:

1. Regular daily readings may be taken of maximum and minimum temperatures, of rainfall and of atmospheric pressure. A rota could be organized whereby groups of pupils could take on the duty of recording the information, each group being responsible for one month's readings. Such information will provide the school with a long-term record of daily variations in the measurable weather.

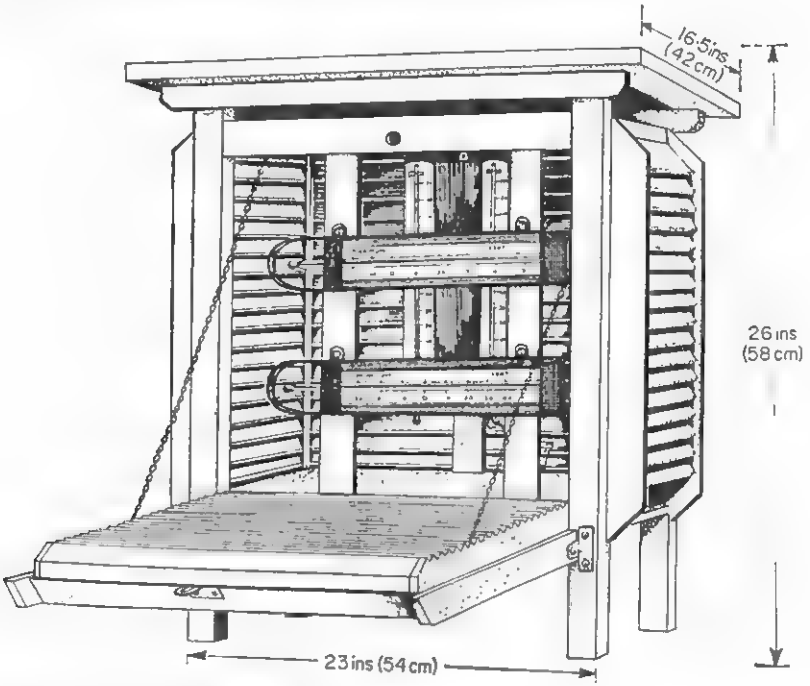


Fig. 17 Stevenson's screen

2. In addition to the above procedure, or sometimes instead of it, it may be instructive to organize from time to time an intensive study of the weather during one week. This will involve frequent readings of the thermometer and barometer, for example every two hours, to obtain actual temperature and pressure readings throughout the day. The state of the sky and wind speed might also be recorded if possible. Rainfall need only be recorded once a day. With such a record available, it may be possible for the pupils to become aware of the relationships existing between types of weather and variations in temperature, pressure, cloud amounts and wind speed. For example, with a group of 16-year-old pupils, the passage of a depression, or of a front, may

Date and time	*Min. temp.*, °F or °C	*Max. temp.*, °F or °C	*Rain-fall*, in or mm	*Baro-metric pressure*, m.b.	*Wind direc-tion*	*Wind speed*, m.p.h. or km/hour	*Clouds type*	*Cloudi-ness* $\frac{1}{10} \ldots \frac{10}{10}$	*Actual temp.*, °F or °C	*Wet bulb temp.*, °F or °C	*Dry bulb temp.*, °F or °C
10-5-65 13.00 hours											

Fig. 18 Weather recording table

be illustrated by reference to such an intensive record. An added advantage of this method is that it is easier to maintain an interest in weather recordings if pupils are required to take frequent readings over a short period of time rather than infrequent readings over a long period.

Methods of recording weather observations

There are two stages involved in this process. First, the immediate and rapid record made outside the classroom. This is best done on a

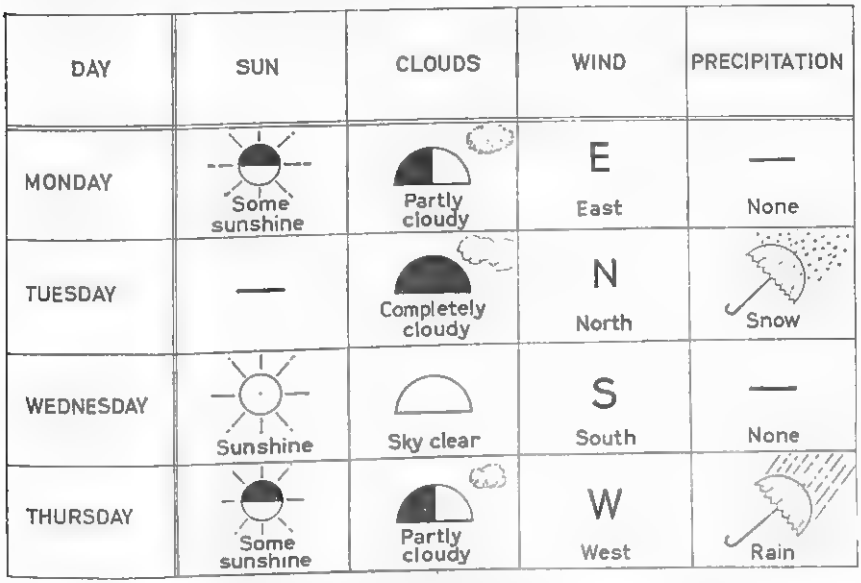


Fig. 19 Symbols for simple weather recording

duplicated sheet so that the information can be quickly taken down in a tabulated form, as shown in Fig. 18. Of course, the table need not be as elaborate as that shown in Fig. 18, since in many cases it may only be possible to record temperature, precipitation, wind direction and cloudiness. In the case of young primary school children, records will be even simpler and may use symbols as shown in Fig. 19. The symbols adopted need not be those shown in Fig. 19; they can be devised by the teacher in a form which will be readily understood by the children of the locality. Obviously a pupil in Ghana would not need the symbol for snow, but he might wish to record a thunderstorm by means of such a symbol as ↘ or ⌈↯.

Second, the permanent records to serve the purpose of classroom

interpretation. These records should be, as far as possible, in graphical form, as shown in Fig. 20. The temperature and precipitation graphs are drawn separately for clarity when used with beginners. With more

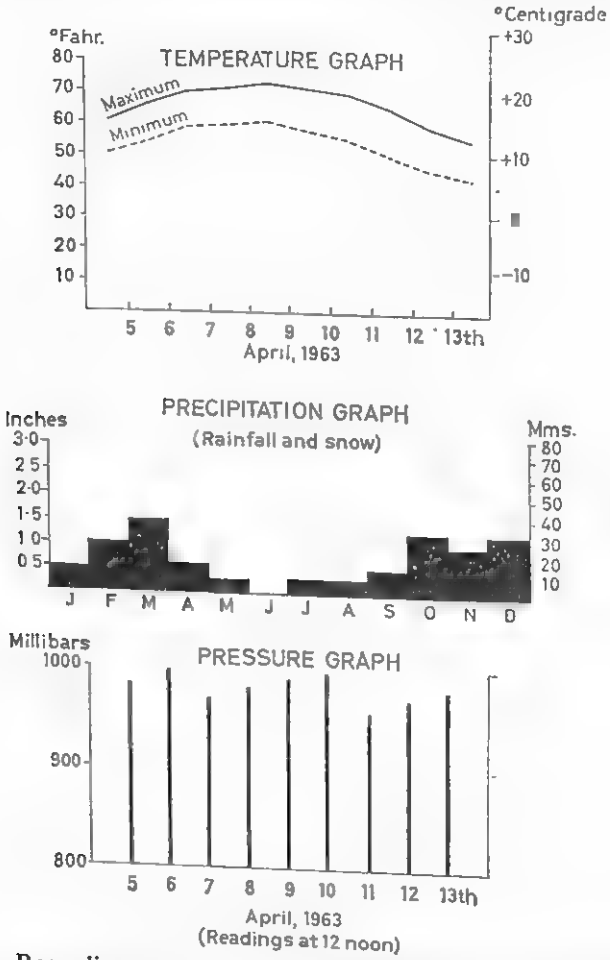


Fig. 20 Recording temperature, precipitation and barometric pressure graphically

experienced pupils it will be possible to combine the temperature and precipitation graphs in one diagram.

The purpose of weather observation

Not only will weather observation awaken interest in the relationship between the various elements which make up the weather, but it

will make dry statistical information come to life. Once a pupil has experienced a raw damp day and recorded a temperature just above freezing point (say about 2° C, or 35·6° F) he knows just what that temperature feels like. Similarly he will begin to understand the meaning of 30° C (or 86° F) in the shade. This is important, as often many school pupils have but the scantiest notion of the significance of temperature figures. Further, by working out the daily means from the minimum and maximum temperatures, it will be possible for them to appreciate that the same daily mean may be derived from widely differing temperature figures, e.g. a daily mean of 10° C (50° F) might be derived from either:

(*a*) Max. temp. 11° C (51·8° F), min. temp. 9° C (48·2° F)
(*b*) Max. temp. 20° C (68° F), min. temp. 0° C (32° F)

Thus the nature of the diurnal range of temperature is appreciated.

Again with rainfall, the schoolchild will realize just how much it has to rain before 25 mm (nearly 1 inch) of rainfall can be measured.

More important from the geographical point of view perhaps, is the possibility of noting how the changes in the weather may affect plant growth or farming activities in a rural area. In an urban area, the effect of weather on visibility (fog), drainage systems and transport may be noted. It is also important to know thoroughly the climate and weather conditions of the home region to enable comparisons to be made with other climatic areas.

Conclusion

In this chapter on the teaching of geography by direct observation, an attempt has been made to give some practical guidance to the teacher who is beginning to apply such methods to the teaching of geography. It needs to be emphasized that the technique of obtaining geographical information by direct observation is fundamental to the subject and that no teacher of geography can afford to dispense with this technique. It might be asked whether such methods have any relevance to the development of favourable attitudes towards international understanding. Indirectly, they have. Much misunderstanding comes from popular misconceptions about other people, from inaccurate secondhand or thirdhand information.

The value of the direct observation method lies in that it shows pupils how to observe accurately various facts and it makes them critical of sweeping generalizations such as may sometimes be found

in certain textbooks. Further, the field work technique often reveals marked differences in the way of life of peoples in the same country. These differences are seen as adaptations or responses to differing geographical environments. It is only a step further to note, when studying peoples outside the home country, that their lives may in many ways be similar to our own, and that where they differ from our own, this difference amounts to an adaptation to different geographical or historical influences. The teacher must, however, consciously point this out to his pupils; he must be positive in his own attitude towards other peoples. From this may spring an attitude of tolerance.

Lastly, the teacher working with little equipment should not be disheartened if he or she is only able to try one or two of the suggestions made in this chapter. The important thing is that an attempt be made to get the children to observe certain facts directly and to get away from book-learning only. In fact, the teacher who is working with a minimum of equipment and few textbooks has a chance of starting his geography teaching in a sound manner by concentrating on direct observation. If the teacher can convince his pupils that there is purpose and meaning in this work, he will obtain their enthusiastic co-operation.

4 Teaching techniques: indirect observation

GEOGRAPHICAL INVESTIGATION is essentially based on the scientific attitude to knowledge, that is on observations which are recorded and later interpreted.

The interpretation may be more of an art than a science, in the sense that many of the facts observed may be qualitatively rather than quantitatively distinguished. But geography teaching would fail to imbue pupils with the right spirit if it became essentially a bookish study. Unfortunately more geography has to be learned in than outside the classroom. The teacher can, however, ensure that the learning process is based on the scientific attitude by insisting that the pupils find out as much information for themselves under his guidance, from materials (maps, books, pictures, films, etc.) which the teacher provides for them or that they have obtained for themselves, rather than learning from direct instruction, that is, from a kind of lecture.

It is now proposed to examine some of the techniques whereby this general attitude to learning geography may be applied.

The ordinary lesson

It may be appropriate to start with what may be the most frequently given type of lesson, namely, the lesson which relies essentially on the use of the chalkboard, the use of the atlas and the textbook. The lesson which is given below is aimed at a class of 13- to 14-year-old pupils. It seeks to show certain broad geographical facts and relationships concerning Malaya. It does so, however, by making the pupils comment on facts which are placed before them in the form of atlas maps, chalkboard sketch maps, and statistics in tabular form written up on the chalkboard. No attempt is made to make the presentation more polished than it could be in the classroom, nor is there any attempt to introduce a degree of accuracy in the statistics which would have no significance to the pupils or affect the conclusions arrived at in the lesson. The answers to the oral questions put by the teacher are given in brackets after the questions.

NOTES FOR A LESSON ON MALAYA[1]

Aims

1. To show that the population of Malaya is mainly concentrated in the west of the peninsula and to explain why this is so.
2. To show why rubber is such an important product and what geographical conditions favour its growth.

Equipment

Wall-maps of Asia, or South-east Asia (if available); atlases, text-books if useful (for photographs, maps, charts, diagrams); sketch maps on the chalkboard; statistics of population and production (Fig. 21 and Fig. 22).

Method

Oral Questioning and Instruction

1. Pupil detailed to come to wall-map and locate the position of Malaya by pointing to the correct place.
   The teacher now puts questions to the whole class.
2. Open your atlases to page . . . Find Malaya. Where is Malaya with respect to:
   (*a*) Sumatra? (North and east.) (*b*) Thailand? (South.) Teacher states Malaya to be just over 50,000 square miles (130,000 sq km) in area. Compare this with area of the home country.
3. Look at your atlas map page . . . which shows the density of population in Asia. Find Malaya on that map. Now where in Malaya is the population density greatest? (Along the western side of the peninsula.)
4. Look again at your atlas map of Malaya. Is there any evidence there that most people live on the western side of the peninsula? (Many big towns are on the western side.)
   Name some of these towns. (Kuala Lumpur, Penang, Ipoh, Port Swettenham, Malacca.)
5. Let us now find out why most people live in the west of Malaya. Look at the sketch map (Fig. 21).
   Can you now suggest reasons why most people live on the western side of Malaya? (Most cultivated land lies on the west, much of the centre and east are forest or swamp.)
   It may be appropriate for the pupils to comment on the physical features of Malaya in relation to the forest, i.e. many, if asked,

1. Mr W. L. Dale of the University of Malaya helped in the drafting of this lesson.

will notice that the forested areas correspond to a large extent with the mountain backbone of the Main Range and the Eastern Highlands; also some pupils will, if asked, volunteer the information that some of the cultivated areas correspond with the lowland of the main river basins: those of the Sungei Pahang, Sungei Kelantan, and Sungei Perak.

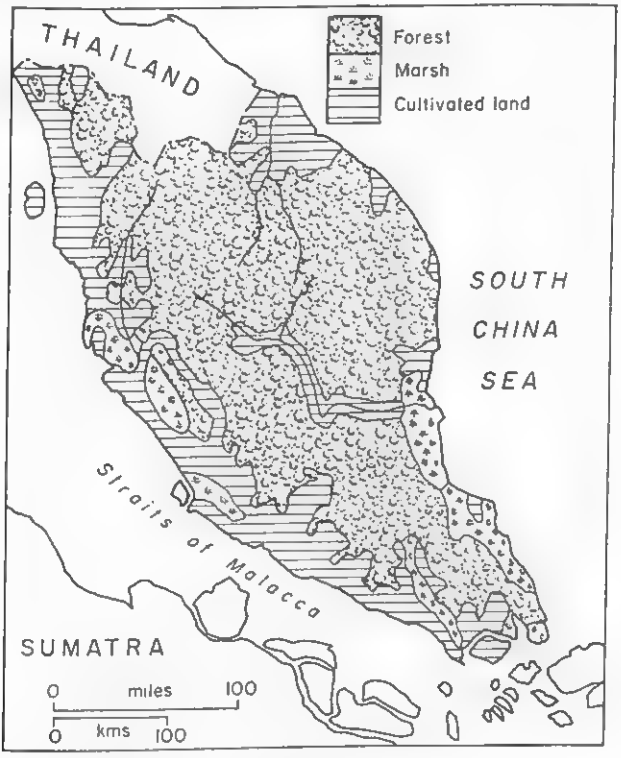


Fig. 21 Population and land use in Malaya

Written Notes

At this stage the information obtained may be written down under the following headings:

MALAYA

(*a*) *Position and size.*
(*b*) *Distribution of population.*

The class may be asked to make its own notes, or if this is deemed too difficult for certain classes, the teacher may write the notes on

the chalkboard and the pupils can copy. To allow for some effort on the part of the pupils, the teacher is advised in the latter case to leave some key words out of his summary which the pupils may fill in on their own.

Oral Questioning

The following statistics are written on the chalkboard:

COMMERCE 1959

	$[1]
Value of exports and re-exports from Malaya	2,473 m
Value of rubber gross exports	1,722 m

POPULATION 1959 (to nearest 000)

Malaysian	3,406,000
Chinese	2,520,000
Indians and Pakistanis	767,000
Others	123,000
	6,816,000

6. How can you tell that rubber is by far the most important export of Malaya? (Accounts for more than half the value of total exports.)
   Then make sure that pupils know that rubber is the product of a tree.
7. Look at map on the chalkboard (Fig. 22). Where are rubber trees grown? (Mainly on the western side of Malaya.)
8. Suggest reasons, bearing in mind what we have found out about Malaya, why most of the rubber-growing areas are in the west. (Forest and highland in the centre and east, swamps in the east, difficulty of clearing land in the centre and east.)
9. Explain that rubber trees grow wild in the forest of the Amazon basin in South America, that some seeds were taken from South America and planted in Malaya and grew very successfully.
   Why were the original planters successful?
   Examine the following temperature and rainfall figures for Penang:

1. The local currency is the Malayan dollar, equivalent to U.S. $.33.

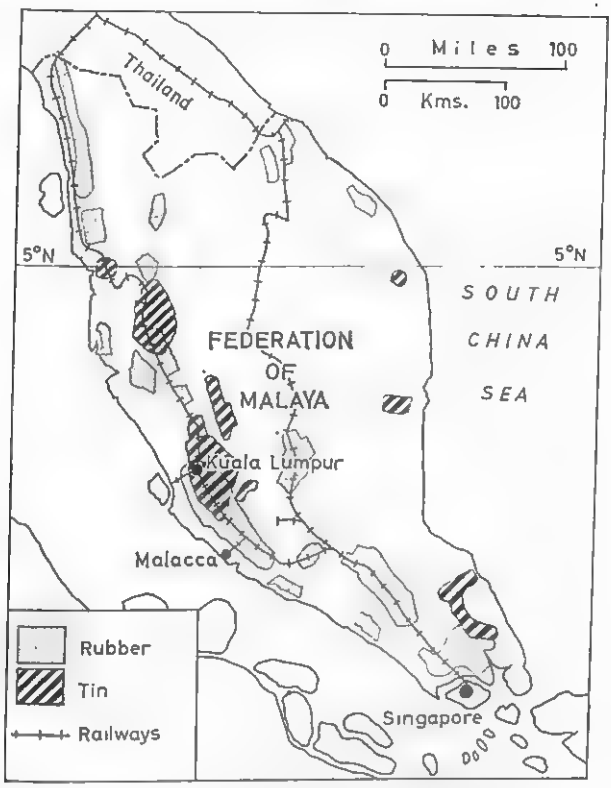


Fig. 22 The rubber and tin-producing areas of Malaya

MEAN MONTHLY TEMPERATURE AND RAINFALL

Month	*J*	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*O*	*N*	*D*
Temp.												
°C	27	27	27	28	27	27	27	27	27	27	26	26
°F	80	80	80	82	80	80	80	80	80	80	79	79
Rainfall												
mm	99	76	119	178	280	183	226	326	483	410	277	122
in	3·9	3·0	4·7	7·0	11·0	7·2	8·9	12·8	19·0	16·1	10·9	4·8

Yearly average rainfall total = 109·3 in

Emphasize that these are average figures.
Are the temperatures high or low? (High.) Compare these with your local temperature records.
Do the temperatures vary much throughout the year? (No.)
Is the total rainfall high or low? (High.)
Is there a dry month? (No.)
Compare with your local rainfall.

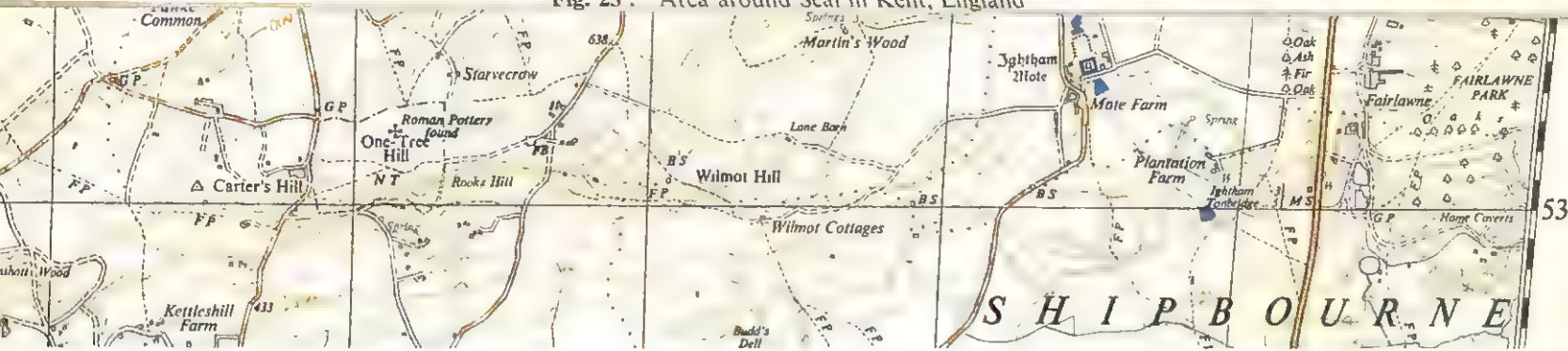
Conclude that temperatures and rainfall are high throughout the year and that rubber trees grow well under these conditions.
(If the class has knowledge of monsoon winds then it may be desirable to point out that the absence of a dry season is in part due to the two monsoons that Malaya receives. The teacher may also want to explain why temperatures are high, i.e. Malaya's position just north of the equator means that the intensity of solar radiation is greater there than in areas north or south of the tropical zone.)

10. A favourable climate alone would not explain the presence of rubber plantations.
Where are rubber trees *not* grown besides the forest areas? (In the swamp region.)
This is because rubber trees like a well-drained soil.
Why then is much of the western area suitable? (The foothills of the area afford sloping land with good drainage.)
11. Tell the class that the demand for rubber increased enormously during the twentieth century. In 1905, 145 tons of plantation rubber were produced. By 1910, this had gone up to 8,200 tons; and by 1950 some 1,200,000 tons of plantation rubber were being produced.
Why was so much rubber being produced? (Need for vehicle tyres.) If many plantations were developed, what were those plantations likely to lack? (Labour.)
12. Now look at table on the chalkboard showing the population of Malaya. What do you notice about the population of Malaya? (There are people of different racial origins.)
Can you suggest a reason why there are so many Indians and Chinese in Malaya today in view of the lack of labour on the early plantations? (Indians came to work on the plantations and stayed in Malaya.) The teacher may point out that the Chinese originally came to mine tin (see Fig. 22), another important product of Malaya (to be considered in another lesson), and that they too settled in the country. Some have taken up work on the plantations, so that all three races now work on plantations.

Written Notes

A résumé of what has been learned may be noted down under the headings below, which continue the notes written earlier. The aim in setting out the written notes into separate sections is to show how the lesson may be broken up into short periods of oral questioning fol-

Fig. 23 : Area around Seal in Kent, England



REFERENCE

Roads, Ministry of Transport Class I — Fenced / Unfenced

" " " " " II — Good, metalled / Poor, or unmetalled

Other Roads

Footpaths — FP Fenced / FP Unfenced

Railways, Multiple Track — Station, Bridge over, Cutting, Tunnel, FB (Footbridge), Sidings, Viaduct, Level Crossing, Embankment, Bridge under

" Single Track

" Narrow Gauge

L P T B & Glasgow District Subway Stations ... ○ Interchange Stations ..... ⊗

Aerial Ropeway

Boundaries { County or County Borough / " " County of City (in Scotland)

" " " " " with Parish

" Parish

Pipe Line (Oil, Water) — Pipe Line

Electricity Transmission Lines (Pylons shown at bends and spaced conventionally)

Post Offices (In Villages & Rural Areas only) P

Church or Chapel with Tower. Church or Chapel with Spire Church or Chapel without either

Triangulation Station on Church with Tower without Tower

Intersected Point on Chy on Church with Spire without Spire + on Building

Guide Post GP · Mile Post MP · Mile Stone MS · Boundary Stone BS ○ Boundary Post BP ○

Youth Hostel Y Telephone Kiosk (Public) T (AA) A (RAC) R Antiquity (Site of)

Public Buildings

Quarry & Gravel Pit

National Trust Area — Sheen Common NT

Osier Bed

Reeds

Park, Fenced

Wood, Coniferous, Fenced

Wood, Deciduous, Unfenced

Brushwood, Fenced & Unfenced

Glasshouses

Orchard

Furze

Rough Pasture, Heath & Moor

Marsh

Well W ○

Contours are at 25 feet vertical interval, shown broken in built up areas.

Spot Height 123

Crown Copyright reserved.

lowed by short periods of note taking, to introduce variety into the lesson.

(*c*) *Main product of Malaya.*
(*d*) *Conditions which favour the growth of rubber trees in Malaya:*
(i) temperature
(ii) rainfall
(iii) drainage
(*e*) *Position of most rubber plantations in Malaya.*
(*f*) *Labour supply for the rubber plantations.*

Again, according to the ability of the class, the teacher will give more or less help with note taking.

The teacher can end the lesson by stating that other aspects of Malayan life and trade will be considered in later lessons.

Conclusion on the lesson on Malaya

It will be noticed that the equipment required for the lesson was limited technically. Atlases and a wall-map were the only 'visual aids' required. Yet the teacher had, in order to put over his lesson successfully, to obtain a good deal of information from various sources. For example, the population and commerce statistics were obtained from *The Statesman's Year-Book*,[1] the chalkboard sketch maps are derived from school textbooks,[2] the climatic statistics were taken from Kendrew's *Climates of the Continents*.[3]

Having obtained the information the teacher must present it to the class in a stimulating way and by skilful questioning get the pupils to draw conclusions from the facts. The teacher may later be able to lead his pupils to find out much information for themselves.

The lesson using large-scale maps

When it is not possible to go out of doors, then the large-scale map provides a useful document on which the pupils' powers of observation can be brought to bear. The significance of the term large-scale varies with the geographical area under consideration. In densely

1. S. H. Steinberg (ed.): *The Statesman's Year-Book*, London, Macmillan, 1961.
2. Fig. 14 from T. Herdman (ed.): *Island Harvests of the Far East*, London, Longmans, Green, 1962 (Colour Geographies, Unit 10), p. 17.
Fig. 192 from L. D. Stamp and L. S. Suggate: *Geography for Today, Book III*, London, Longmans, Green, 1956.
3. W. G. Kendrew: *Climates of the Continents*, 4th edn, Oxford University Press, 1953.

populated areas such as the Ganges Valley, a scale of 1 : 63,360 or 1 : 50,000 would be suitable. In the Pampas areas of South America, a scale of 1 : 200,000 may be adequate since relief features and features of human geography are not likely to change very rapidly over short distances. These maps are available on various scales in most countries, but it is still true that many areas of the world have been mapped only on a small scale so that detailed maps are unlikely to be available. We shall take an example from Great Britain partly because very large-scale maps are available and partly because the map used in the example has actually been used in schools. But the sort of work which is suggested in the following paragraphs can be done on any large-scale map of any part of the globe. It must be emphasized that it is the method which is being illustrated and not the facts shown on the map. The facts are only given so that the method can be demonstrated. (Fig. 23, facing p. 81.)

Examples of work which may be set on a large-scale map

The map shows part of the country in western Kent, about 25 miles (40 km.) south-east of London; it is on a scale of 1 : 25,000 or approximately two and a half inches to one mile in English length units. The area shown on the map has an area of just over 35 sq km (5 km from east to west and just over 7 km from north to south). It consists essentially of:

1. A chalk escarpment, running approximately west to east (the scarp facing south), which may be found in the north of the area. The top of the scarp rises to over 700 ft (*c.* 210 m) in parts (the contour lines are in feet at 25 ft (*c.* 7·5 m) intervals).
2. A clay valley at the foot of the scarp, running from east to west, the floor of the valley along which runs a railway line being some 300 ft (*c.* 90 m) above sea level.
3. A sandstone ridge or escarpment, whose gentle slope faces north and whose steep scarp slope faces south. This ridge occupies most of the southern half of the area shown on the map. The ridge is dissected by a number of small valleys. Most of the ridge is wooded with mixed coniferous and deciduous trees.
4. In the extreme south and south-east of the map area, part of another clay vale.

When large-scale maps are used as a means of teaching geography, three stages are involved:

FIRST STAGE (for pupils aged 9 to 12)

The pupils must be made to learn the meaning of the various conventional signs or symbols used on the map. This learning process is often best done by using the map outdoors, so that the children get to know the features for which the symbols stand. But since this is not always possible, the symbols must be learned gradually, step by step, in the classroom, a few at a time over a period of weeks. To help the learning process the symbol may be drawn close to a picture of the feature it represents on the chalkboard. Learning symbols should only form part of a lesson, never the whole.

At this stage the pupils may be led to grapple, with growing confidence, with the information provided on the map. Here are a few examples of such exercises based on Fig. 23.

1. *Directions.*
   In what direction does the railway run?
   In what direction does the road (A25) from Ightham to Seal run?
2. *Types of roads* (on the map, trunk roads, A-class roads, B-class roads and minor roads are coloured differently).
   What type of road runs from Ightham to High Cross?
   What type of road runs from Seal to Tanners Cross?
   What type of road runs from St Clere to Lower St Clere?
3. *Vegetation.*
   Name a deciduous wood, a mixed deciduous and coniferous wood,
   Name an area with orchards.
   Name a parkland.
4. *Human features.*
   Name a village with a church with a spire, and a village with a church with a tower.
   Name three farms.

These four examples do not, of course, exhaust the possibilities of this stage, and many other similar questions could be devised.

SECOND STAGE (for pupils aged 12 to 15)

The second stage occurs when the pupils are able to visualize the relief of the map as shown by the contour lines. It is highly doubtful whether they will ever do this if they are never taken out into the country to compare a contour map with hills as they really are. But once they have learned to associate a particular contour pattern with a real physical feature, then all future map reading becomes much easier.

Work which might be set to help this process of visualizing and understanding the physical landscapes is as follows:

1. Draw a cross-section along grid line 56 from north to south and annotate this section, showing the position of the scarp top, scarp face, railway in the valley, the main A-class road, Fawke Farm House, One-Tree Hill, and part of the southern sandstone scarp.
2. In what general direction does the northern scarp run?
3. Describe the drainage in the area bounded by east–west grid lines 57 and 59.
4. Give examples of: a small valley with spring, a small dry valley, a flat-topped hill, a spur.
5. Describe the relief of the area between east–west grid line 57 and east–west grid line 53.

THIRD STAGE (for pupils aged 14 and upwards)

The third stage occurs when the pupil is ready to interpret the information on the map in a way which shows that he understands the influence of physical features and drainage on the human features and vice versa. At that stage he can make a true geographical synthesis, and such questions as the following might well be asked:

1. What do you notice about the position of the villages of Kemsing and Heaverham in relation to the scarp? What advantages would the inhabitants of these villages have over people living at the top of the scarp?
2. Why does the railway follow an east to west course?
3. What does the large amount of woodland suggest about the quality of the soil in the area of the southern ridge, given that England is a densely populated country?

An intensive study of a small area like that shown on the map is often much more rewarding than an attempt to deal in a routine manner with a much larger area.

The use of pictures, photographs and charts

The use of pictures, photographs and charts in a geography lesson has two main aims:

1. A photograph can give reality to a word, a notion or a concept which before was only vaguely understood or even completely misunderstood. For example, how many children have a clear understanding of the word 'scarp' until they have seen one? Again, how

many town children misconceive the real nature of a V-shaped valley, because they have never seen one in real life or on a photograph?

2. Visual presentation has a stimulating effect on the pupils and helps to keep them interested. For example, a table of statistics on petroleum production, showing the quantities produced by various countries, is much less interesting visually than a series of columns showing the production of each country. Further, the relative level of production of each country is much more easily appraised from a graph than from a table of figures.

Thus a picture, a photograph or a chart or graph can often be used as the starting point of a lesson, a means of focusing the class's attention. Or it can be used dramatically in the middle of a lesson to revive flagging interest, or to illustrate a point just made.[1]

It is important to realize, in all visual presentation, that the features of a picture which are significant to a child are not necessarily those which strike the teacher. In showing a particular picture the teacher may wish to make the point that, say, the weather appears hot and dry, whereas the child's attention may be focused on the make of the motor car shown in a bottom corner! Thus the teacher's part in presenting visual material is all-important because on him or her depends the extent to which the child observes what is important geographically.

There are three main ways of using pictorial material:

1. Within the textbook

Very often textbooks contain useful geographical pictures which are not used because the teacher has decided to dispense with the written material in the book. Even if the text is ignored because it is out of date or ill-conceived or just dull, a skilful teacher may be able to incorporate the examination of some of its photographs in a lesson.

2. Use of pictorial material singly

By this is meant the use of a large photograph or graph which the teacher shows the class at one stage in the lesson to illustrate a particular point. The picture may be held up in front of the class for a few minutes while the teacher asks questions about it or points to particular features. The picture can then be removed from the class's view once the significant features have been observed. This enables

1. For sources of pictures see Chapter 7.

the class to move on to the next point and prevents the picture from acting as a subsequent source of distraction. The teacher can always refer to the picture again if necessary during the lesson.

It is vitally important that this method be used only if the pictorial material is large enough to be seen by all in the class. A picture whose features can only be seen by half the class leads to a sense of frustration and much movement by those who cannot see.

3. Use of pictorial material in group form

A teacher may possess a number of very useful geographical pictures which, because of their size, are unsuitable for display to the class as a whole. In such cases, it may be possible to use them in such a way that the children can see them in small groups. One way of doing this is to divide the pictures into three or four groups. Each group of pictures is pinned in a distinct part of the classroom. With each group of pictures are a number of questions, to which the children are to find the answers. The class is then divided into three or four groups accordingly and each group is given say five minutes in which to answer the questions on the pictures before it. Then after five minutes, the groups are asked to move round to the adjacent pictures and the process is repeated until all the groups of pictures have been seen. It may be necessary in some cases to spend a whole lesson on this process. Usually, however, only part of a lesson is required, and when the pupils have sat down in their desks again, the teacher can use the results of their observations in developing his lesson. This is an active lesson, suitable for classes which may find sitting still for 40 minutes or more a trying experience. An alternative form of this type of lesson is to give each child a questionnaire and allow him to wander round at will getting the answers to questions in whatever order he likes.

An example of a simple lesson using one photograph is given below (suitable for pupils aged 13):

THE VILCANOTA VALLEY IN PERU

Aim

To describe the physical features of a river valley in a mountainous area from a particular example.

Equipment

Wall-map or atlas to show position of the Vilcanota (Urubamba) river in Peru; black and white photograph of the Vilcanota river near

Cuzco[1] or a number of small ones so that each pupil has access to one. (Fig. 24 facing p. 88.)

Oral Questioning and Instruction

Method

1. Ask class to look up position of the river in atlas. Ask pupils to describe the relief of the area. (The area is mountainous and very high.)
   Name the mountains. (Andes.) Draw a sketch map to show the position of the Vilcanota in Peru. Depending on the ability of the pupils, the teacher may allow them to do this on their own, or may draw a sketch map on the chalkboard.
   Ask the pupils to mark Cuzco on map.
2. Tell pupils that the photograph displayed was taken near Cuzco (Fig. 24).
   What is background like? (Mountainous.)
   Name the mountains. (Part of the Andes.)
   Is the skyline smooth? (No—it is rugged.)
   What are the sides of the river valley like? (Very steep. Some parts are rocky.)
   What do you estimate to be the angle of slope? (30–45° from the horizontal.)
   Is there anything in the picture which indicates the great height of the mountains? (Trees by river bank look very small.)
   Describe the course of the river. (Tends to twist.)
   Therefore the valley itself tends to twist and turn—hence the background part of the valley is hidden by a part of the mountain-side which projects forward (shown on picture)—this is known as a spur.
   What is the hill like on the side opposite the spur? (It is like a smaller valley, that is, it is a re-entrant.) Therefore, the spurs are not opposite one another, but are offset. They are known as 'interlocking spurs'.

Written Notes

Here the main points discussed so far may be summarized in note form on the chalkboard. (The phrases in italics may be left out and filled in by the pupils.)

1. Kip Ross: 'Peru, homeland of the warlike Inca', *The National Geographic Magazine*, vol. XCVIII, no. 4, Oct. 1950, pp. 421–98; see pp. 440–1 for the colour picture of the Vilcanota Valley.

A river valley such as the Vilcanota in mountainous country is *steep-sided*, and the mountain-sides are rugged, the valley often having slopes of *45° from the horizontal.* The river tends to twist and turn, and a view down the valley is cut off by *interlocking spurs.*

Oral Questioning

3. Now concentrate on the valley floor. Describe the relief of the valley floor. (It is flat.)
4. Is all the land almost at the same level as the river? (No—some of it is slightly higher.)
5. These higher parts are known as 'river terraces'—what are they used for? (For growing crops or for grazing.)
6. What do you notice about the bed of the river? (Part of it is exposed.) These are sand or shingle banks.
7. What happens to the river water in the stream where there are shingle banks? (It splits up into various channels.) A stream which is so divided by sand and shingle banks is known as a 'braided stream'.

Written Notes

Further summarize the information discussed above and write the following notes on the chalkboard.

The valley floor is generally *flat*—some parts are higher above the stream level; these are known as *river terraces.* The river is a *braided stream.* This means that it is divided into various channels by sand or *shingle banks.*

Sketch

To complete the recording of the observations made above, the pupils will draw a simple annotated sketch of the features shown in the photograph. (Shown completed in Fig. 25, opposite. Most pupils will not, of course, be able to draw such a good sketch when they first start.)

The use of projected pictures[1]

The great advantage of projecting a picture on a screen is that the projected picture is large enough for all the pupils to see each detail

1. See Chapter 5.

Fig. 24. Vilcanota Valley near Cuzco, Peru

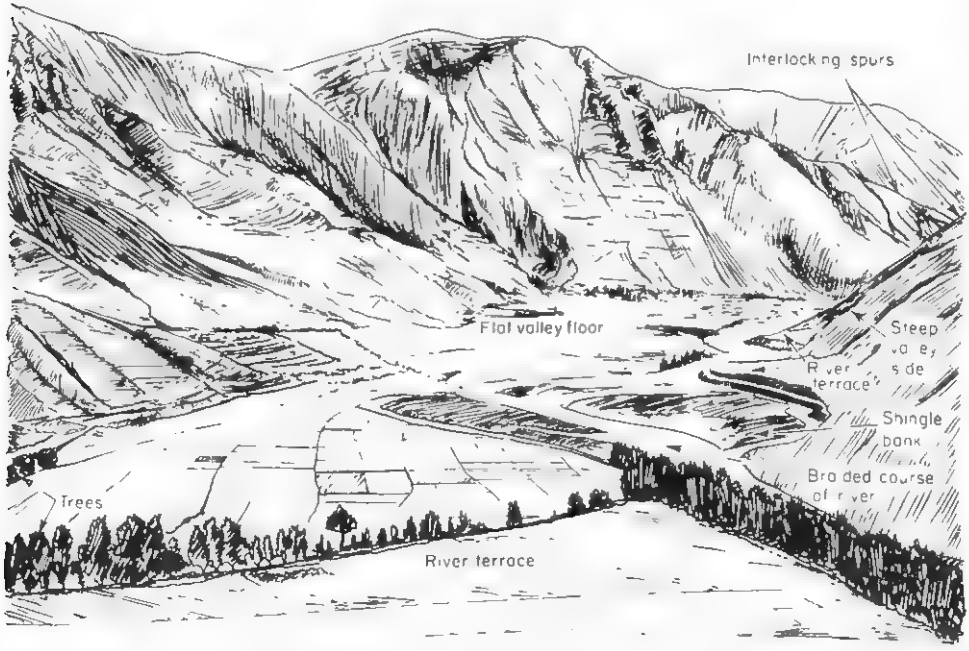


Fig. 25. Sketch of Vilcanota Valley

clearly. Thus most of the difficulties of using ordinary pictures are avoided. Projected pictures may be obtained by using:

1. *An episcope* (opaque projector) for projecting pictures from a book or loose pictures. The disadvantage of this apparatus is that some light is lost and the picture obtained is usually poorer than that obtained with a slide projector.
2. *A filmstrip and slide projector.* Most modern filmstrip projectors have an attachment which allows the projection of 2 in × 2 in (50 mm × 50 mm) slides.

In both the above cases the technique of using the picture on the screen for geography teaching purposes is no different from that of using a photograph as shown in the lesson above. The teacher must be careful to select his filmstrip or slides very carefully, so that he knows precisely what he is going to show and what questions he is going to ask. Because projection is an attraction in itself, it is sometimes tempting to show many slides, or to go through a whole filmstrip of some forty frames. This temptation should be avoided, since no class can possibly do any careful observation or store facts from more than about six to eight slides or frames of a filmstrip. As the order of the pictures on the filmstrip may not be that which the teacher requires for his lesson, the teacher must be prepared to 'flash through' a number of unwanted frames until he comes to the wanted one. Alternatively, if the teacher wishes, he may cut up the filmstrip into individual frames which can be used as required. In such a case, it would be best if each frame were mounted to form a slide.

3. *A film projector.* The showing of a film is probably, to children, the most attractive form of visual aid. Because it has this appeal, it can all too easily be abused and films may be shown at the slightest pretext.

The great qualities of moving films (see Chapter 5) are not always to be found in all films. It is therefore of paramount importance that any teacher who intends to use a film for a lesson should be quite familiar with it beforehand and should be convinced that it has something valuable to offer the children. Once a teacher has decided to plan a lesson around a particular film (which should not be too long—twenty minutes at the most), he then has to decide how he is going to use it. Bearing in mind that children will not necessarily observe what the teacher considers significant, the teacher should interrupt the film at least once or twice during its progress to put questions to the children or to allow them to ask questions about what they have seen.

For example: A film called 'Apulian village'[1] shows the life of a village in southern Italy, the landscape, the wheat fields, the olive groves and the grape harvest. The teacher could interrupt this film to ask:

1. What was the shape of the houses in the village? Of what materials were they built?
2. Were the streets narrow or wide? How were they paved?
3. What were the women doing?
4. What clothes did they wear?
5. What were the hills like in the background? What colour? What rock are they probably made of?
6. Was there much vegetation on the hills?
7. What animals were grazed on the hills?
8. Where are the wheat fields and the vineyards? Why are they there?
9. Where does the labour supply come from when the farmer wants to harvest his grapes?
10. What are the grapes used for?

These questions could be duplicated on paper if oral questioning is deemed unsuitable.

Some of the observations could be noted on rough paper and later copied into a notebook.

It is useful to show the film through a second time without a break. This enables those who missed a point during the first showing to observe it. Whether the second showing is possible in the lesson depends, of course, on the length of the lesson and the length of the film. If not, it may be possible to use the film again when revising.

An alternative method of using a film is, before the showing of the film, to give the pupils a list of points to look out for. For example before showing a film called 'Nomads of the desert'[2] which is about Arabs in the Sahara, the teacher might put up the following list on the chalkboard:

1. Note the type of clothing worn by the Arabs.
2. Note what the ground is like in various places shown.
3. Describe the tents.
4. What determines where they set up camp?
5. Explain why they go to market.
6. Describe the farming activities of the oasis visited.
7. What makes those activities possible?

1. In the series 'The Earth and its Peoples'—United World Films, 1443 Park Avenue, New York 29, N.Y., U.S.A. 2. *Ibid.*

The pupils then know what to look out for. This method is useful when the teacher knows he will not have time to show the film a second time.[1]

Most films which can be hired from film libraries are sound films. While the provisions of a commentary and sound effects may be admirable, it often happens that the commentary is excessively long and dominates the whole film. Consequently pupils sometimes give too much attention to the commentary and not enough to what can be observed on the screen. Many teachers therefore prefer to use the film without sound. This enables them to make their own commentary and put their own questions to the class without fear of being interrupted by the film's commentator. The use of a film in a geography lesson is a most potent way of arousing interest, and probably the most effective way of showing the actual conditions of life in distant lands. It is up to the teacher to see that a good film is not misused by inadequate preparation.

The use of sample studies

Most older geography textbooks gave generalized accounts of regions, which, because they were in a sense abstractions from reality, were often dull and uninspiring. Many modern textbooks have avoided dullness by using the sample study approach. 'A sample study', write Mrs Long and Mr Roberson, 'is a detailed study of a unit, chosen particularly to show human response to environment, and chosen so as to be typical of the major region concerned.'[2] The unit chosen may be a farm, a village, a factory, or whatever is typical and significant in the region under study. There are several advantages in the use of the sample study method. First, the teacher is using an approximation to the 'field study' or direct observation approach. For example, in studying a particular farm, say in the pampas of Argentina, the pupil is in a sense observing just those details of the farm, its stock, its equipment, its labour force, etc., which he would in fact observe if he were able to go there in person. Since sample studies usually include photographs and statistical information, the pupil can also gather facts about the relief and climate of the area where the sample is taken.

1. On this topic see J. W. N. Hill: 'Film use in the lesson: an analysis', *Geography*, vol. XLV, parts 1–2, Jan.–April 1960, pp. 90–7.
2. B. S. Roberson and I. L. M. Long: 'Sample studies: the development of a method', *Geography*, vol. XLI, part 4, Nov. 1956, pp. 248–59.

Secondly, the sample taken is a unit which the pupil can comprehend readily, whereas the region is a much more sophisticated concept. It is easier for the child to work from an understanding of a small unit in a region to an understanding of the region as a whole, than it is for him to work the other way round.

The third reason for using sample studies lies in the field of international understanding. International understanding is helped if we feel some sort of sympathy with the foreigner, with the man from a far country. The building up of a feeling of sympathy with such a remote person is a delicate matter, but it is much more likely to develop if we can be, so to speak, carried into his home, which is what studying a small unit often implies.

On the other hand a generalized description of an area can seldom be effective in awakening a sense of kinship with the foreigner

Examples of three lessons based on three sample studies are given below.

Sample study no. 1

A FRUIT FARM IN KENT
(for pupils aged 12)

The sample study in this case is a fruit farm in Kent (England). The map and information provide the raw material from which the lesson can be drafted.

Aim

To show that fruit farming in Kent is influenced by:

(*a*) south-facing aspect (for sunshine),
(*b*) slope (for water and air drainage),
(*c*) soil (affecting land use).

Equipment

Sample study of Pickhill farm (may be obtained from the Association for Agriculture, London, England); information and map being put on chalkboard or duplicated; wall-map of England.

Method

Oral Questioning

1. Show position of farm on a map of England. (Tenterden is 25 miles or 40 km west of Folkestone in the south-east of England.)

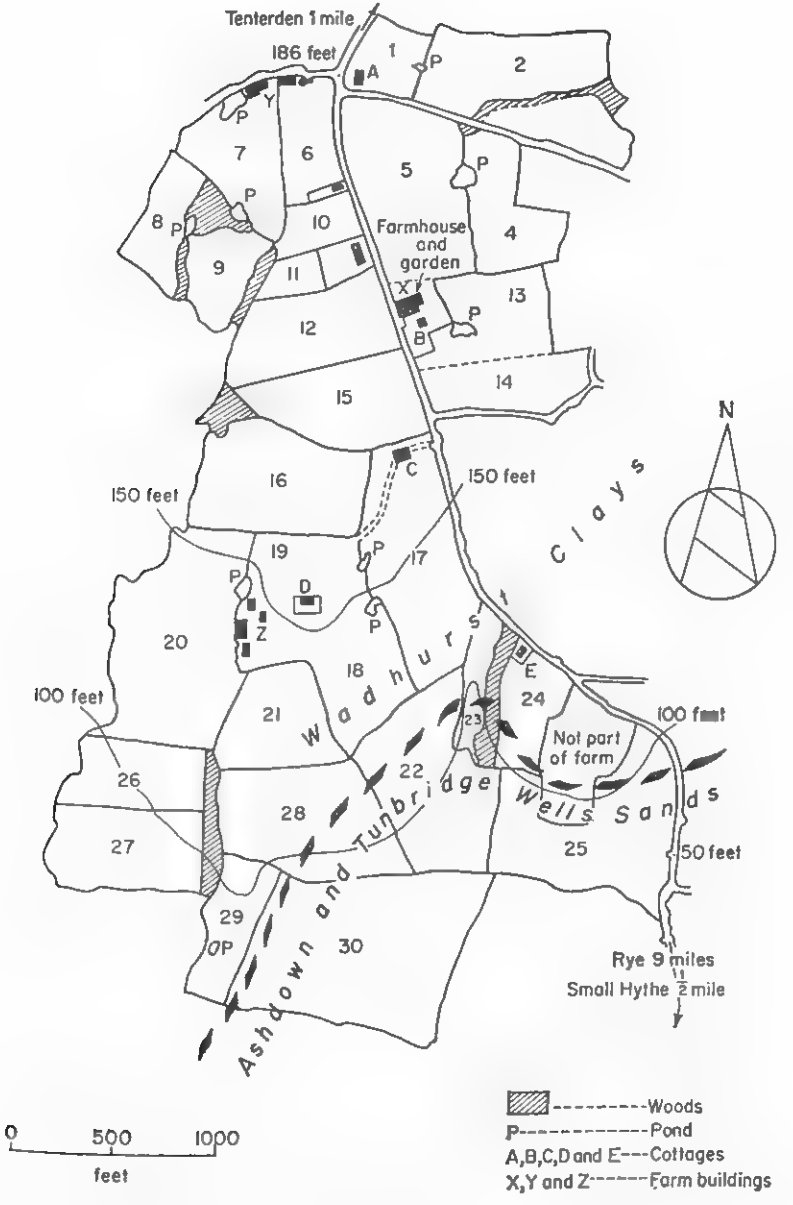


Fig. 26 Pickhill Farm, Tenterden, Kent

2. Ask pupils to look at details of areas used for various purposes (to be written up on chalkboard):

Distribution of land on Pickhill Farm

	(*in southern area*)	
Fruit (apples, pears, plums, cherries)	112 acres (*c.* 45 hectares;	
Hops	25	1 hectare = *c.* $2\frac{1}{2}$
Arable	39	acres)
	(*in northern area*)	
Pasture	20	
Wood	5	
	201 acres	

Stock: 10 bullocks, 170 ewes, 30 hens

3. Does this farm produce only one agricultural commodity? (No, it is a mixed farm with animals as well as crops.)
What kind of crops occupy the biggest area? (Fruit crops: 112 acres or 45 hectares.)
What is the total size of the farm? (201 acres or 80 hectares.) This is fairly large for western Europe.

Written Notes and Sketch-map

The pupils should now write notes such as the following:

PICKHILL FARM, KENT

(*a*) *Position:* This farm is situated in south-east England in the county of Kent, some 25 miles (40 km) west of Folkestone by road.

(*b*) *Type of farm:* Pickhill Farm is a mixed farm where crops are grown and animals kept. It specializes in fruit such as apples, pears, plums and cherries. Just over half the total area of the farm is devoted to fruit crops.

(*c*) *Size of farm:* 201 acres (*c.* 80 hectares). This is a large farm by western European standards.

A sketch map to show the position of the farm may be drawn.

Oral Questioning

4. Now examine more closely the site of the farm. (See Fig. 26.)

(*a*) Look at the contour lines on the map. Is the farm land flat or sloping? (Sloping.)

(*b*) In what direction does the farmland slope downwards? (The land slopes down to the south.)

5. (*a*) What are the advantages of facing south? (Sunny aspect since this farm is in the northern hemisphere.)

   (*b*) What are the advantages of being on a slope? (Good water drainage and air drainage which minimizes the risk of frost in the spring when trees are in blossom; the cold frosty air tending to sink to the lower ground.)

6. What is the difference in underlying rocks between the north and south of farm? (Clay in north and sands in south. Explain that this has led to the southern end of the farm having lighter and better drained soils than the northern end which has heavier and wetter soils.)

   What difference is there in the use of the land? (Cherries in the south, arable land in the north.)

   Which crop seems to prefer the lighter soils? (Cherries.) Therefore, the nature of the soil has a great influence on which crops are grown in various parts of the farm.

7. The teacher may now ask the pupils to generalize on the influence of relief and soil on fruit-growing in Kent, and notes such as the following may be taken.

Written Notes

The influence of relief and soil on land use at Pickhill Farm

(*a*) *Relief*

Pickhill Farm lies on a gentle south-facing slope. This is fortunate because:

(i) The orchards will benefit from a greater amount of sunshine than if the slope had been north-facing.

(ii) The slope allows moisture to drain away from the soil—fruit trees do best in a well-drained soil.

(iii) The slope allows cold air which is heavier than warm air to sink to the lower ground. If the ground had been flat and low, the cold air would have remained in the orchard. (Cold air is a danger at blossom time since it may, during a period of frost —especially at night—kill the blossom and prevent the trees from bearing fruit.)

(*b*) *Soil*

Pickhill Farm has:

(i) Heavy soils in the north, underlain by clay—these are used for arable crops.
(ii) Lighter soils in the south, underlain by sand—these are used for fruit crops, especially for cherries.

(*c*) *Conclusion*

The farmer has adapted the land use on this farm to take advantage of the slope and different types of soils. The county of Kent in England, which is a fruit-growing county, has many similar farms, though they vary in detail from Pickhill Farm.

This is a method which can be extended to other fields. Its great advantage is that the pupil is faced with a real farm, and realizes that in this case, for example, a fruit farm is not necessarily a farm where nothing but fruit is grown. A good deal more information can be given and worked on depending on the ages and abilities of the pupils in the class.

Sample study no. 2

Our second example is taken from Africa. It is a study of a kraal (village) called Yafele's Kraal,[1] situated about 25 miles (40 km) east of Salisbury, the capital of Southern Rhodesia.

AGRICULTURAL PROBLEMS OF A VILLAGE IN SOUTHERN RHODESIA (Yafele's Kraal)
(for pupils aged 14 and upwards)

Aim

To show that the growth in the wealth of the village is limited by—

(*a*) the subdivision of land into small units,
(*b*) the overproduction of maize in relation to other crops,
(*c*) the lack of fertilizers.

Equipment

Atlas or wall-map showing map of Africa; sketch map of Yafele's Kraal on chalkboard, or on duplicated sheets of paepr.
Table of land use.

1. Information from J. H. Beck: 'Yafele's Kraal: a sample study of African agriculture in Southern Rhodesia', *Geography*, vol. XLV, parts 1 2, Jan.–April 1960, pp. 68 78.

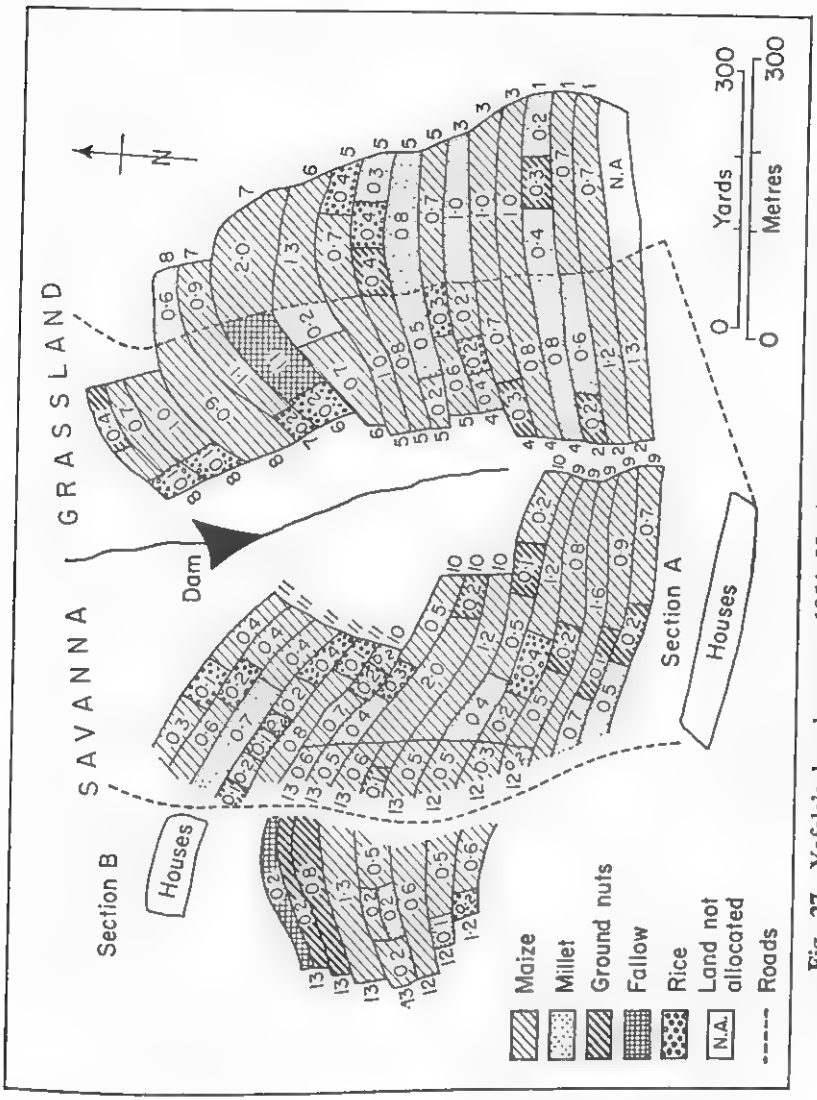


Fig. 27 Yafele's kraal—crops 1954–55. Acreages of crops are shown in terraces which are numbered to indicate the family owning the terrace

Method

Oral Questioning and Instruction

1. Turn to page . . . in your atlas which shows a map of Africa. Find Southern Rhodesia.
   Now find Salisbury. (Slightly north-east of the centre of Southern Rhodesia.)

The village we are to study, called Yafele's Kraal, lies some 25 miles (40 km) east of Salisbury close to a main road.

2. Look at a relief map of Africa.
   Is the land high or low? (High, about 4,000 ft or 1,200 m. above sea level.)
   Does the land around Salisbury appear to vary greatly in height over a few miles (kilometres)? (No, the land remains about the same general height.)
   Therefore what sort of a physical feature is the land area of the village? (A broad plateau, or so it appears from the atlas.)
3. Population—Yafele's Kraal is a small village of thirteen families, with a total of sixty-one children. Of this number of families, there are two widows, leaving eleven men. Not one of these men works full time on the land of the village. They all have employment outside. Only four of the men return home at night. The others return home at the weekend, save one who lives permanently in Salisbury.
   What does this state of affairs suggest about the land? (There is not enough land to keep a man occupied full time—the land probably does not produce enough to enable the families to live without the men working for wages.)
4. Let us then examine the land area available for cultivation. Look at the map of Yafele's Kraal (Fig. 27).
   What does it show? (The field or terrace boundaries, what grows in each field, the area of each terrace, the position of the river and the dwellings, roads or paths.)
   What do you notice about the position of the cultivated land in relation to the river? (The cultivated land is on either side of the river, probably on sloping valley sides—hence the name terrace in the map for each piece of cultivated land. The land is therefore not completely flat in spite of its being on a plateau.)
5. What crops are grown? (Maize, millet, groundnuts, and rice.) Maize, groundnuts and rice are all food crops, whilst millet is used for brewing beer, though it may also be used for making a kind of porridge if necessary.
   Is there a cash crop? (No.)
6. What do you notice about the size of each field or terrace? (Most of them are less than one acre in size (0·4 hectare). Many are only 0·2 of an acre in size (less than 0·1 of a hectare).)
   Look at the land belonging to family no. 11.
   How many crop patches are there? (Sixteen.)
   But how many crops are grown? (Four.)

Therefore, only four patches of land are really required, or five if fallow land is counted.

7. Why is farming small patches of ground likely to be inefficient? (There is waste of time in moving from one patch to another; each patch being small, it is not possible to use modern equipment.)

Written Notes

Pupils should be asked to make their own notes under the following headings:

YAFELE'S KRAAL.

(*a*) *Position and relief.*
(*b*) *Population.*
(*c*) *Farming.*
(i) Crops grown.
(ii) Uses of crops.
(iii) Size of terraces.

Oral Questioning and Instruction

8. Look at table of areas devoted to various crops (below).

YAFELE'S KRAAL

Acreages, by farms, of individual crops: 1954–1955

Farmer	*Fallow*	*Maize*	*Millet*	*Groundnuts*	*Rice*	*Total acreage*
1	—	1·4	0·6	0·3	—	2·3
2	—	2·5	0·6	0·2	—	3·3
3	—	2·0	1·0	—	—	3·0
4	—	2·1	0·8	0·3	0·2	3·4
5	—	4·0	1·6	0·4	1·1	7·1
6	1·1	2·0	0·2	—	0·2	3·5
7	—	4·0	—	—	0·2	4·2
8	—	2·6	0·6	0·4	0·2	3·8
9	—	5·9	1·2	0·5	0·4	8·0
10	—	5·3	0·8	0·3	0·5	6·9
11	0·1	3·3	0·7	0·2	0·8	5·1
12	—	2·7	0·1	—	0·2	3·0
13	0·2	4·4	0·2	1·1	—	5·9
	1·4	42·2	8·4	3·7	3·8	59·5

Note: 1 hectare = *c.* 2·5 acres

Has each farmer much land? (No, at the most 8 acres.)
What do you notice about the areas devoted to various crops? (By far the greatest area is under maize.)

9. Now in order to maintain the fertility of the land, the crops should be rotated in any given field and the fields manured in the following order:

1st year: maize plus manure	3rd year: groundnuts
2nd year: maize	4th year: millet.

If this is carried out, then the area given over to maize should be approximately equal to that given over to groundnuts and millet. Therefore, what does the great maize area imply? (It means that farmers are growing too much maize each year compared with leguminous crops.)

10. This will tend to prevent improvement in the fertility of the soil unless much manure or artificial fertilizers are put on the land. But:
    (*a*) the amount of manure put on the land is limited because villagers cannot own too many cattle without over-grazing the Savanna;
    (*b*) farmers cannot afford to buy much artificial fertilizer. The land therefore has a low productivity per acre, about one-seventh of the productivity of well-farmed land.

Written Notes (the teacher may help the pupils to take down these notes)

Agricultural problems of Yafele's Kraal

The production of crops on village land is low because:

1. Each farmer has a small area of land.
2. Each farmer's land is subdivided into small patches.
3. A proper crop rotation is not observed—such rotation would help to maintain the fertility of the soil.
4. The farmers cannot afford to spend much money on fertilizers; they have no cash crop to sell.
5. Similar difficulties are met with by farmers over much of Central Africa.

Conclusion on the sample study of Yafele's Kraal

Although the problems of agriculture in Central Africa are complicated, no attempt has been made to study them in all their com-

plexity. In one lesson, some aspects of the problems have to be selected. This does not preclude the teacher from making further use of information contained in the sample study to develop the topic in a series of lessons. This particular study, for example, could be developed to consider the effect of climate on agriculture and the problem of cattle ownership.

Sample study no. 3

A DESERT OASIS IN THE SAHARA[1]

(for pupils aged 11 to 13 or older)

The sample study in this case is Touggourt, Algeria, northern Sahara. From a study of the diagram the composition of an oasis should emerge; the extent of the palm-growing area, the number and extent of the settlements both permanent and temporary, the basic problem of water supply which is the genesis of the oasis, other features such as the market, burial ground, possible encroachment of sand, communications with the rest of the world, changing function, etc.

Study the map (look up the terms in the dictionary if you are not sure of their meaning)

1. Find the valley; which part of the diagram does it occupy?
2. How does its shape remind you of a river? (Meanders.)
3. Is there a river in it now?
4. What relief feature borders the valley?
5. Measure the distance from one side of the valley to the other.
6. How much of the area shown on the map is valley? How much sand, etc.?
7. What is this kind of valley called?
8. Is the palm-growing area (*palmeraie*) in the valley or on the higher land?
9. List the different things you find in the valley.
10. How many towns are shown on the map?
11. Are the towns placed on the higher or the lower ground?
12. Are the towns placed in the palmery or not?
13. Write down the different kinds of home in which people live.
14. List all the different kinds of buildings you can find.
15. Are any buildings that you would find in your locality absent in Touggourt? (Schools.)

1. Dr Gladys Hickman, Dept of Education, University of Bristol, has supplied the text and diagrams for this sample study.

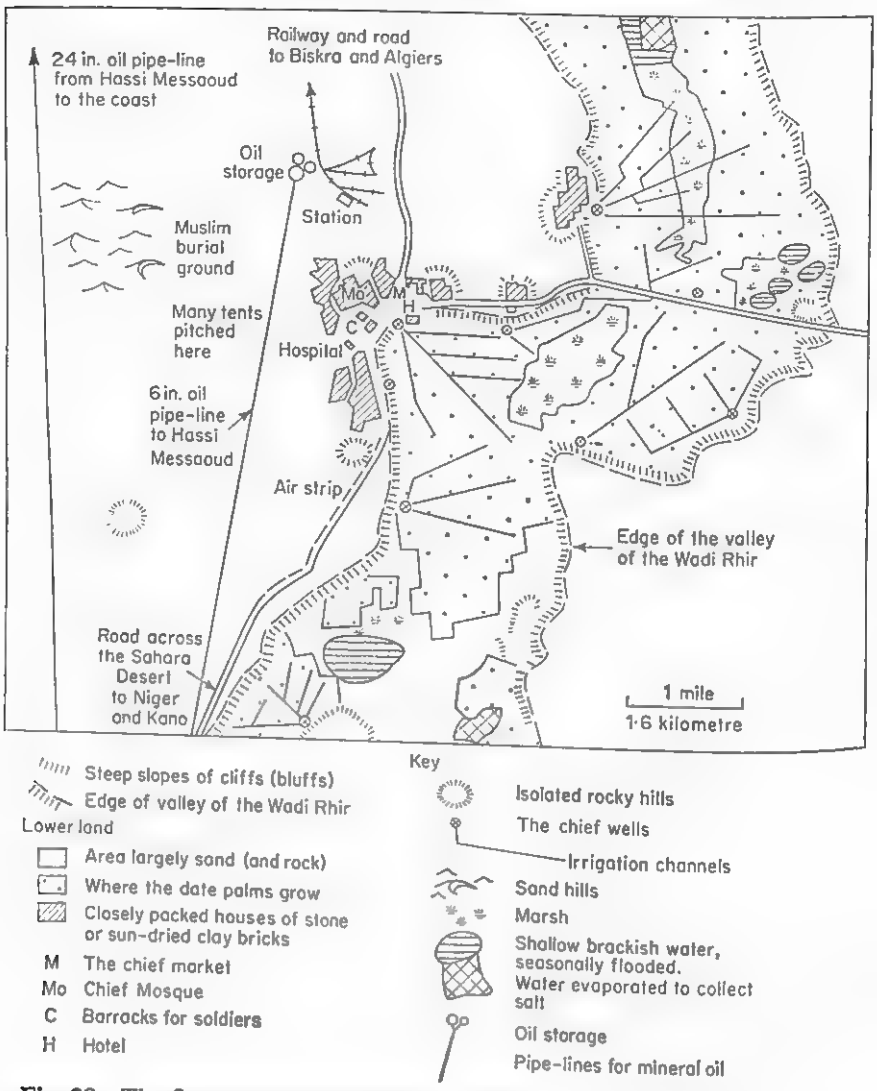


Fig. 28 The five towns of Touggourt, Algeria, North-West Africa

16. You notice 'chief market'. What does that suggest to you? (Similarly 'chief mosque', etc.)
17. How many main wells are there? Does this suggest that there are other wells or not?
18. List the *places* with which Touggourt is linked.
19. What different *kinds* of communication link are there? What others are there likely to be?

20. What kind of desert is this? (Rocky, stony, sandy.)
21. What is the religion of the people?

The questions can be edited and others composed to suit the needs of the class. It is a pity that this map cannot show the encroachment of sand; others sometimes do, and pictures are also useful. Other questions to ask, though the answers cannot all be found in the diagram, include:

Why is there such a large oasis here? (Artesian water, accessibility, a cash crop, etc.)
Are all oases as large as this?
What is the fundamental element in oasis life? (Water.)

What do all these things tell you about Touggourt?

Ordering the data, and some discussion of their significance

This section of the lesson is concerned with systematizing the facts discovered and with filling out the picture through discussion, reference to pictures available in textbooks and any other sources. The class teacher directs the study and discussion towards the points he wants the class to know. In this study the emphasis is on three things:

1. The physical setting.
2. The nature of desert life.
3. Evidence of change.

1. *The physical setting:* sand and rock deserts; wind; wadis and other landforms to be found in desert areas; the term 'oasis'; other major cases (including examples in the lower Nile valley); aridity and the need for irrigation; traditional and newer methods of raising and distributing water; climatic statistics.

This is how much rain falls and the temperatures for each month in a representative weather station in the northern Sahara:

	J	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*O*	*N*	*D*	*Year*
Rainfall													
in	0·9	0·7	0·8	1·2	0·2	0	0	0	0	0·8	0·4	0·6	5·6
mm	22·9	17·8	20·3	30·5	5·1	0	0	0	0	20·3	10·2	15·2	142·3
Temp.													Average
°F	49	54	62	71	77	88	93	91	85	72	59	50	71° F
°C	9·4	12·2	16·7	21·7	25	31·1	33·9	32·8	29·4	22·2	15	10	21·7° C

Add up the rainfall for each month to find out how much falls in one year. Which months have no rain? Is this the cool season or the hot season? Which month has the highest temperature; the lowest? Subtract these to find the difference between the hottest and the coolest months (we call this the *range* of temperature).

Find out something about the *daily* range of temperature; about the vegetation; about the wind and movement of sand.

Make a chart to show the work done in cultivating the date palms in each month of the year; include fertilization of date palm flowers in late March and April. Add work done on other crops, picking seasons, etc. An example of such a calendar, or work chart, is shown for a cotton-producing, near-desert area, where irrigation is used—the Gezira region of the Sudan Republic.

2. *The nature of desert life:* desert life in relation to the physical setting; reasons why the settlements are where they are; settled population, nomads, nomads becoming settled; ownership of land and water rights; methods of sharing water; the variety of work in oasis towns.

3. *Indication of change:* to be found in the diagram and in pictures from magazines, newspapers, textbooks, etc. Most people who are unfamiliar with deserts think of them as unchanging. While this is true of certain features, desert life, in common with that in other parts of the world, has many new features developing alongside the old. It may be worth while to ask the class to *write down* its ideas of life in desert and oasis *before* beginning the lesson and the study of the diagram; and then to make a list of all the things that they did not expect to find in the diagram. If the study can be supplemented by pictures one can realize the change brought about by electricity (oil-based) for light; power mills for grinding grain; electrically driven machines in small workshops, etc., and for refrigeration; kerosene, for light and cooking; refrigerators for cool drinks in small restaurants or booths in the market; changes in food and eating habits with the import of canned foods such as sardines, tomato purée, sugar, etc.; changes in transport, the greater ease of movement within the oasis group because of buses and lorries; communication in terms of radio, telephone and knowing what is going on in the world; and greater movement to find jobs and earn money. The greatest change of all, the increased scale of operations, comes from the discovery and use of artesian water for irrigation.

The order of study may, of course, be changed. Some people would prefer to take section 2 first (the nature of desert life) and then say 'Why?' This leads on to a study of existing features partly in terms of the physical setting.

		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temp	°F	70	73	79	86	91	91	89	89	88	87	80	72
	°C	21·1	22·8	26·1	30	32·8	32·8	31·7	31·7	31·1	30·6	26·7	22·2
Rain-fall	in.	0	0	0	0	0·5	1·5	5	5	2	0·5	0	0
	mm	0	0	0	0	12·7	38·1	127	127	50·8	12·7	0	0

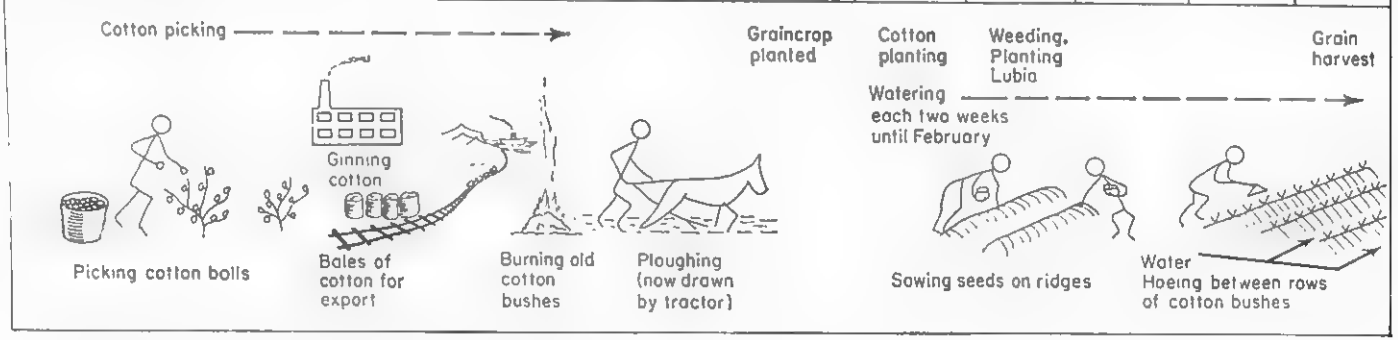


Fig. 29 Cotton-growing in the Gezira, Sudan

Generalization: reference to other parts of the Sahara and other world deserts (see Chapter 2, Fig. 2)

1. Why are deserts where they are? The world location of tropical deserts on the west side of landmasses in the Trade Wind zone; off-shore winds and currents; cool currents, land and sea breezes.
2. Different kinds of desert landscape; all deserts have certain things in common, some things that are unique. Variations in vegetation. How far is this study typical of other deserts? (Indirectly it should become clear to older students that an immense amount of variety is covered by geographical generalizations.)
3. More recent development in desert areas:

   New irrigation projects.
   Development of mineral resources.
   Atomic research stations.

Emphasis: that it is worth while developing desert areas if they are economically or strategically valuable.

Conclusion: an approach to the uses of sample studies

The sample study method can be profitably used in:

1. Geography of commodities—

as an introduction to each crop in a series of studies on its world distribution.

2. Regional geography of the world—

as a type sample for a study of world major (generic) regions; e.g. desert, equatorial, monsoon, savanna, arctic, Mediterranean. Each study should demonstrate general aspects that are common to the regions; the immediate response and way of life; more complex development; and considerable emphasis on the differences between the areas grouped together for this purpose. Approximately twelve studies with their extension gives a fairly good 'world' coverage; this would take at least a term and could very well occupy a longer period of work, up to a year.

3. Regional contrasts within a continent—

as a method of introduction to the study of a continent. A selected number of contrasting regions are studied before a detailed systematic treatment is attempted.

4. Regional contrasts within a country—

as the first introduction to a study of any country but particularly of the larger ones.

Other lesson material

The four lessons which follow, although not included under the individual headings of the preceding sections, are designed to help the teacher explain topics of general interest, in relation to various regions of the world. The first three lessons deal with phenomena observed in Asia; the fourth relates to Latin America. In each case the teacher will first of all give pupils an understanding of the nature of the phenomenon—dry zones in tropical countries (1st lesson), volcanic activity (2nd lesson), fisheries (3rd lesson), or coffee-growing (4th lesson)—he will then go on to demonstrate how general ideas may be applied to particular geographical environments.

First lesson

THE DRY ZONE OF CEYLON[1]

(for pupils aged 14 to 16)

Aim

1. To define the dry zone of Ceylon
2. To examine some of the problems of agricultural development in the dry zone.

Equipment

Atlases or wall-maps of Ceylon or India and Ceylon; sketch maps showing rainfall distribution: (*a*) mean annual rainfall, (*b*) mean rainfall, May to September.

1. Information for this lesson was provided by Miss P. Pasiah, of St Bridget's Convent, Colombo, and Professor K. Kularatnam of the University of Ceylon.

Method

Oral Questioning and Instruction

1. Open atlas, and find Ceylon.
2. What is its position in relation to India? (To the south.)
3. How could you get to Ceylon (i) by air; (ii) by ship from the home country. (Answer would then depend on starting point.)
4. Which is the nearest point of Ceylon to India? (The northern area around Jaffna, or the area near Adam's Bridge.)
5. How wide is the sea from India to Ceylon near Adam's Bridge? (About 40 miles, 64 km.)
6. Why is it thought by historians that most of the people who now inhabit Ceylon are descended from peoples who originally came from India? Where would they have crossed the sea? (Near Adam's Bridge.)
7. Therefore, where is it likely that they first settled? (In the north-west of Ceylon.)
8. Historical evidence shows that this is true. Many of the early settlers from India founded communities in river valleys in the north-west. However, if one looks at the distribution of population today in Ceylon (the class may look this up in their atlas, if there is a suitable map), it is clear that the areas with the greatest population densities are in the south-west of the island. We shall find out why this is so in the course of the lesson.

The rainfall distribution

9. Ceylon is essentially an agricultural country; what geographical factors are likely to have an immediate effect on the growth of its crops? (Soil, climate, temperature, rainfall, sunshine, etc.)
10. Let us select rainfall as a climatic factor. Look at the map of the mean annual rainfall in Ceylon (Fig. 30).
    Where is the rainfall heaviest? (In the south-west.)
    Where is the rainfall lightest? (In the north-east, east and south-east.)
11. This map, however, does not give a completely accurate impression, since the rainfall is not evenly distributed throughout the year. Look at the map of the distribution of rainfall from May to September (Fig. 31). What do you notice? (Most rainfall in the south-west falls in the period May to September. The east and north are very dry during this period.)
12. Look at the map again and suggest why most rain falls during this

period. (It is the period of south-west monsoon winds, bringing rain from the Indian Ocean.)

13. But why should the east be so dry during this period? Look at the physical map of Ceylon in the atlas. Where are most of the mountains? (In the south and centre of the island.) Most of the rain which has been brought by the south-west monsoon will fall where? (On the mountains, because of the effect of relief on air

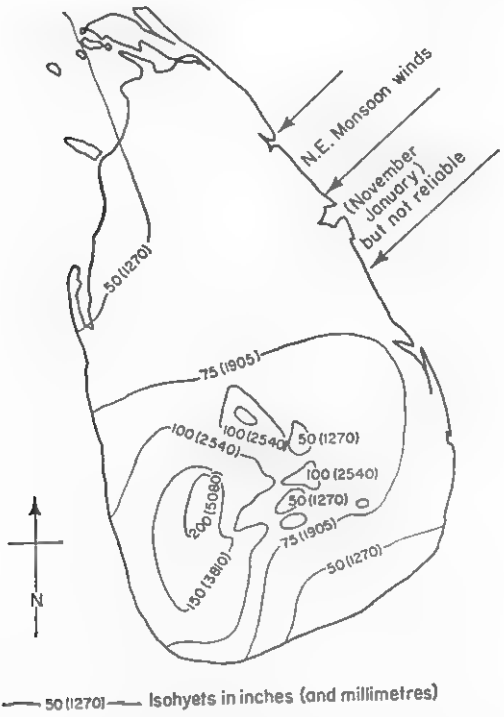


Fig. 30 Ceylon—mean annual rainfall

masses, and in the south-west coastal plains.) In fact the south-west monsoon blows as a dry, scorching wind over the north and east part of Ceylon.

14. However, according to a map showing the Mean Annual Rainfall (Fig. 30), a good deal of rain does fall in the north and east. How much rain falls on an average each year? (Mainly between 1,270 mm and 1,905 mm or between 50 and 75 in.)
15. Now study the rainfall figures for a group of towns in north and east Ceylon.

Station	*Annual rainfall (inches and millimetres)*	*October–January rainfall*
Anuradhapura	57 in 1,448 mm	40 in 1,016 mm
Batticola	69 in 1,845 mm	50 in 1,270 mm
Trincomalee	64 in 1,616 mm	50 in 1,270 mm

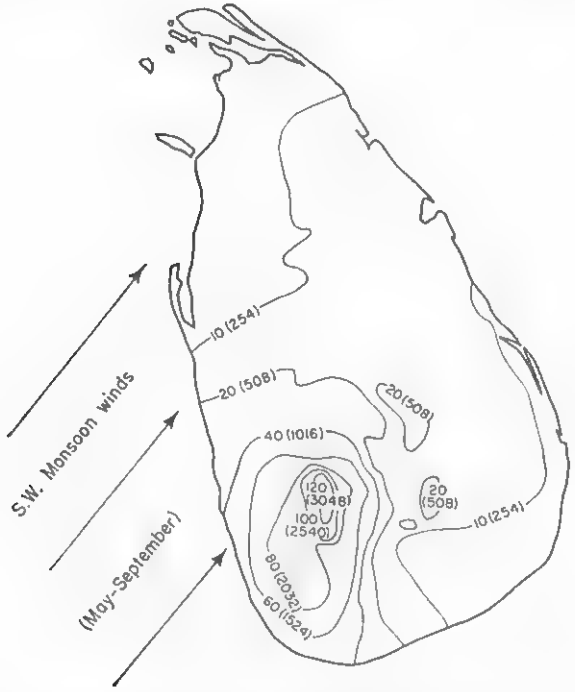


Fig. 31 Ceylon—rainfall distribution and winds (May to September)

What do you notice about the distribution of this rainfall through the year? (Most of the rain falls in the months of October to January.) Look at the map of the Mean Annual Rainfall. Which wind brings this rain? (The north-east monsoon which blows mainly from November to January.)

16. *Summing up*

Ceylon may be divided into two parts:

(*a*) A south-west area or wet zone where rainfall is in excess of 1,905 mm (75 in) per year; rain falling mainly between May

and September and being brought by the south-west monsoon winds.

(*b*) A dry zone in the north and east where rainfall is below 1,905 mm (75 in) per year; rain being brought by the north-east monsoon winds mainly between November and January. This area gets little rain in the season of the south-west monsoon partly due to its lying to the leeward of a mountain mass.

Pupils' Summary

It is suggested that pupils could summarize this information by—

(*a*) drawing a large outline map of Ceylon;

(*b*) inserting a line to separate the dry from the wet zone, corresponding approximately with the 1905 mm (75 in) isohyet, and printing in the correct areas: Wet Zone, Dry Zone;

(*c*) drawing arrows to show the two monsoon winds and indicating, by the arrows, the name of the wind and its duration;

(*d*) putting a dot for and naming the towns for which the rainfall was given above, and also Colombo, Jaffna, Hambantota.

Oral Questioning and Instruction

Developing agriculture in the dry zone

17. As we have seen earlier, the northern part of Ceylon was settled early in history and agriculture developed there, especially along the river valleys where a flourishing civilization developed, based on irrigated agriculture. For various reasons, this civilization decayed and much of the area was overrun by jungle.
Today some of the land is under shifting cultivation (called *chena*). A peasant family selects an area of forest land, clears it and burns the vegetation. On the cleared land, a small dwelling is built and manioc, gingili, chillies and other crops are grown. When the soil shows signs of exhaustion, the family moves on to another area. (Some restrictions on this system are now in force.)

18. What natural hazards has the farmer to face? Let us return to rainfall. What is the annual rainfall in the dry zone? (Between 1,270 and 1,905 mm or 50 and 75 in.) This may seem heavy rainfall to anyone living in temperate zones or on the edge of deserts as in the Middle East.
But when does the rain fall? (Mainly between October and January.) In fact sometimes 635 mm (25 in) may fall in a week or two. Therefore what tends to happen to much of this rain? (It is

lost as run-off which finds its way into rivers and the sea.) Further, temperatures are mainly around 27° C (80° F). So what also tends to happen to much of the rainfall? (It evaporates again.)

19. The rainfall is partly ineffective because:
   (*a*) it is too concentrated in time and much is lost by run-off;
   (*b*) a good deal of the moisture evaporates and never affects the soil.

   But this is not all. Look at the map of the annual rainfall (Fig. 30). What information does this contain about the rain-bearing winds? (They are unreliable.) This means that there may be years when the rainfall is considerably below the average. In years of drought water holes dry up completely, many cattle and even wild animals die of thirst.
20. What is the solution to these problems of water supply? (Irrigation.) This is in fact what is being done—
   (*a*) by restoring ancient irrigation works;
   (*b*) by developing new projects such as the Gal Oya Scheme (south-east Ceylon.)
21. These development projects involve the modernization of agricultural techniques; this means:
   (*a*) The diversification of crops, e.g. the growing of sugar cane, rice, cotton, chillies, yams, vegetables and groundnuts. Why is the diversification of crops to be desired? (Good crop rotation helps to maintain the fertility of the soil; growing a great number of crops keeps a balance between food crops and cash crops, and makes the farmer less dependent on one or two crops which, if they fail, leave him in a difficult position.)
   (*b*) The increase in the yield of crops by improving techniques of production, e.g. by transplanting rice instead of just sowing the seeds broadcast, by limiting the wasteful system of shifting cultivation.
22. In conclusion it may be stated that the re-development of the dry zone is in part necessary owing to the increase in the population of Ceylon and this zone may in the future be the main source of food crops for Ceylon.

Pupils' Summary

Much of the information can be added to the map which the pupils have drawn for themselves, or written up in note form alongside the map under the headings:

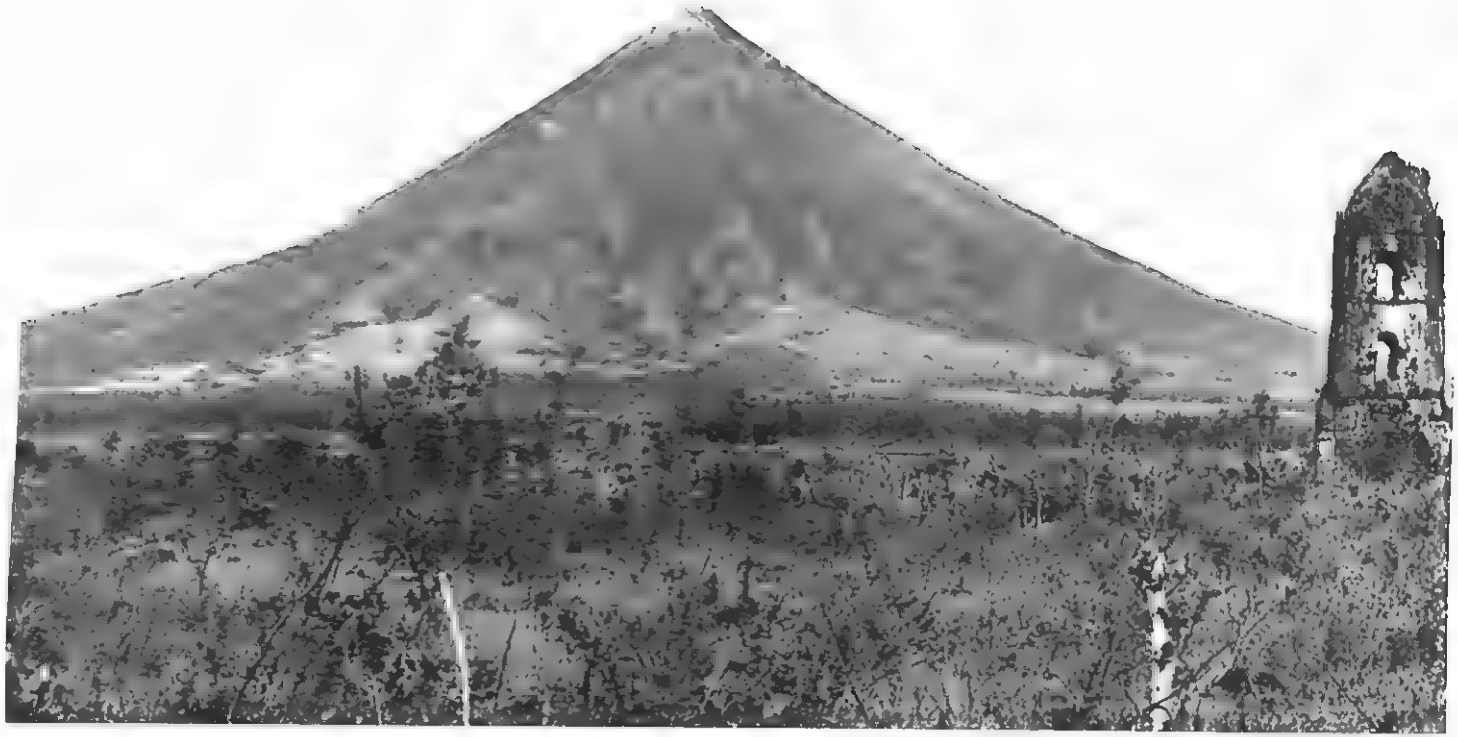


Fig. 34. Mayon volcano in the Philippines

AGRICULTURAL PROBLEMS OF THE DRY ZONE

(*a*) *Rainfall problems*
(*b*) *Agricultural techniques*

Second lesson

VOLCANIC ACTIVITY: THE PHILIPPINE ISLANDS AS AN EXAMPLE[1]

(for pupils aged 13)

Aim

To describe some volcanoes in the Philippine Islands and from these to discover the nature of a volcano, and to classify volcanoes into the main types: active, dormant and extinct.

Equipment

Map of the distribution of volcanoes in the Philippine Islands.
Diagram of a volcanic cone.
Photograph of a volcano in the Philippine Islands. (See Fig. 34 opposite.)
Atlases or wall-map of South-east Asia.

Method

Oral Questioning and Instruction

1. Show photograph of the volcano in the Philippine Islands (Fig. 34). Ask pupils to describe what they can see in the background. (A hill or mountain.)
   What shape is this hill or mountain? (It is in the shape of a cone.)
   Does it look high? (Yes, it seems high judging by the features seen in the foreground.)
2. This hill (some pupils will probably have recognized it as a volcano) is in the Philippine Islands. Open your atlases at page . . . Find the Philippine Islands, north-east of Borneo, east of Viet-Nam.
3. Now find the northern large island of the Philippines. What is it called? (Luzon.)
   North of Luzon lies a group of small islands called the Babuyan islands (if these are marked on the atlas then the teacher can ask the class for the name).

1. The material for this lesson was provided by Professor T. W. Luna of the University of the Philippines.

In March 1952 a ship passing near to the Babuyan Islands noticed a column of white smoke which seemed to be rising in bursts from near a group of rocks called the Didicas Rocks. Later observations showed that the Didicas Rocks had grown into an island 1,214

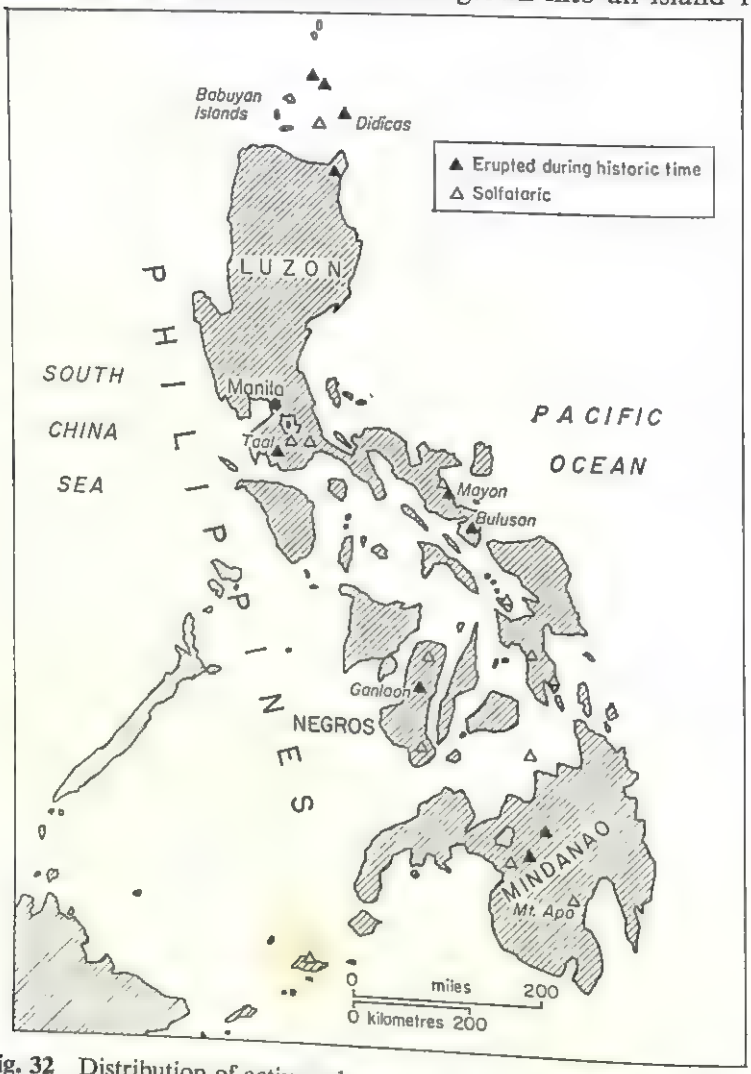


Fig. 32 Distribution of active volcanoes in the Philippines

metres in diameter and with a hill rising to 228 metres (over 700 ft). What do you think this hill was in fact? (A volcano.) Similarly the hill shown in the photograph is a volcano which probably started from nothing.

4. How does a volcano build up into a large cone-shaped hill? Look at the diagram (Fig. 33). This diagram shows a cross-section of a volcano. If at one time there was no hill there, suggest in what way the volcano gradually built itself up. (Material came up the conduit and spread on either side of the orifice. As time went by and more material came up the conduit, so the height of the land on either side increased.)
5. But what is this material which comes up the conduit? Let us listen

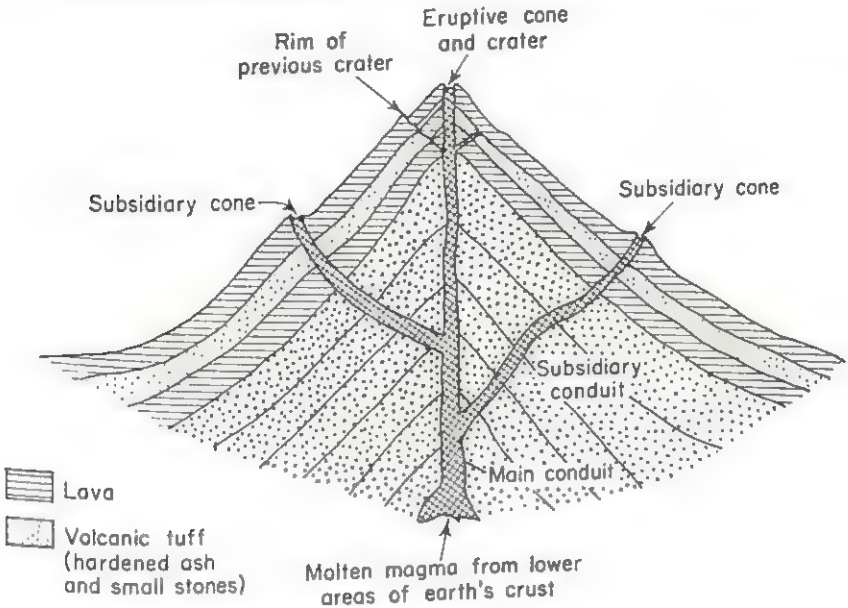


Fig. 33 Diagram of a composite volcano

to what happened in the case of the Mayon Volcano (find its position on the map) in 1814:

> 'Following a series of volcanic quakes, dust-laden vapours rose from the crater and darkened the whole surroundings accompanied by volcanic lightning. A torrent of fire, lava and large hot stones rolled down the southern slope destroying everything in its path. Five towns located near the volcano were destroyed and about 1,200 persons perished.'[1]

What materials, then, are ejected from a volcano? (Dust, gases, stones, lava.)

6. The lava is molten rock which comes from deep down within the

1. Professor T. W. Luna provided these details.

earth's crust. The dust or ash represents the rocks which, as they were blown out of the volcano, shattered into minute particles and then fell back on to the earth. The gases are of various types, and often include steam.

But why should rocks be shattered? The answer lies in the fact that many volcanoes are not continually active. Mayon, for example, has had periodic eruptions since the seventeenth century, the latest being in 1947.[1] What therefore tends to happen to the orifice or crater of the volcano during periods of inactivity? (It becomes blocked with rocks, ash and solidified lava.) Hence, what happens when the pressures from the conduit become intense? (There will be an explosion during which much of the material in the topmost cone will be shattered and thrown up into the air.) In the build-up which follows the explosion, a cone will arise within the old crater. Not all volcanoes react in this way, but most of the Philippine volcanoes are of the explosive type and build up composite cones of lava and volcanic tuff. How is this shown on the diagram of the volcano? (By alternate layers of ash, stones and lava.)

Does a volcano only have one cone? (No—there are subsidiary cones.) These subsidiary cones are linked to the main conduit and contribute to the volcanic build-up on the sides of the volcano. They often eject gases.

Work by the class

(*a*) In your notebooks draw a diagram of a volcano and label its parts clearly.

(*b*) Explain—

(i) how a volcano builds itself up into a cone-shaped hill;

(ii) why some volcanoes are made up of lava, stones and ash.

Oral Questioning and Instruction

7. Look at the map of the distribution of volcanoes in the Philippine Islands (Fig. 32). What two types of volcanoes have been shown on this map? (Those which have erupted in historic time, that is, those about which there is a record; and those which are solfataric.) The word 'solfataric' requires some explanation.

Which solfataric volcano is named on the map? (Mount Apo in Mindanao.) Let us learn something about this volcano from scientists who have climbed to the top of Mount Apo, which is 2,953 metres high. There is, apparently, no single deep crater at the sum-

1. At the time of writing (1962).

mit but a crevasse or crack in the rock surface of the volcano, running from a height of about 2,400 metres to a point near the top of Mount Apo. Around this crevasse is an area about 50 metres wide devoid of vegetation and covered with a mantle of sulphur and ashes. Jets of sulphurous vapours escape from the crevasse with a sharp hissing sound, and hover, cloud-like, over the summit of the mountain. So, what is a solfataric volcano? (It is a volcano whose eruptions are limited to sulphur-containing gases.) The vents from which the gases emerge are known as fumaroles.

8. In some parts of the Philippines, hills can be seen which have the characteristic features of volcanic cones, but which are deeply eroded by the action of running water, and which have been submitted to a considerable amount of weathering.
What does this suggest about the volcano? (It has not erupted for a long time, since, had it erupted recently, erosional features would have been obliterated by a new mantle of ash and/or lava.) Such volcanoes are known as *quiescent* or *dormant volcanoes*, in contrast to *active volcanoes* which are known to erupt from time to time. If an old volcano has never been known to erupt, it is classed as an *extinct volcano*. There are many such extinct volcanoes in the Philippines.

Work by the Class

Draw a sketch map of the main Philippine Islands. On the map show by different symbols, an active volcano, an extinct volcano, a solfataric volcano, a submarine volcano. Under the map explain briefly what is meant by each type of volcano.

Conclusion

Though volcanic activity can have disastrous results as we have seen in the case of Mayon, it must not be imagined that volcanoes have only bad effects. Volcanic rock, once it has weathered into a soil, is very fertile. Most of the export crops of the Philippines, such as sugar cane and abaca, thrive best in areas of volcanic soils.

Third lesson

THE FISHERIES OF JAPAN[1]

(for pupils aged 14)

This lesson is only an outline. Teachers may be able to supplement

1. The material for this lesson outline was provided by Professor Hisao Aono of Tokyo Kyoiku University.

this outline with the lesson on Japan, Chapter 2, and their own documentation (maps, pictures, statistics, etc.).

Aim

To show why Japan has become the most important fishing nation in the world, and to describe some aspects of Japanese fishing (types of fish, techniques of fishing, problems of fishing).

Equipment

Statistics of weight of fish caught by various nations. Atlases or wall-map of Japan showing surrounding seas and sea currents, as well as the relief of Japan. Photographs or drawings showing:

(*a*) types of fish caught (e.g. tuna, mackerel, salmon, bonito);
(*b*) types of fishing vessel;
(*c*) sketch map to show main fishing grounds and the fish caught in these areas.

Method

Discussion and Instruction

1. Establish by getting the class to look at statistics of world fisheries that Japan is the leading country in this field. (6,192,000 tons of catch in 1960; 676,000 fishermen.)
2. State that the purpose of the lesson will be to find out why in Japan fisheries are such an important aspect of the economy.
3. Ask the class to find out the population of Japan. (93 millions.) The area of Japan is about 142,000 square miles (369,000 sq km) for the four main islands. This is just a little larger than the two main islands forming the British Isles, which have a population of only 54 million. What conclusion can we draw from these facts? (Population pressure in Japan on the land is likely to be greater than in the British Isles.) See Chapter 2, Japan.
4. The class should be made aware of the fact that only one-sixth of the area of Japan is cultivable. Why is this? (Large areas are mountainous.)
   At this stage the class might learn the names of the islands of Japan and the principal features of its relief.
5. What does this lack of cultivable land imply for Japan's large population? (A need to turn to other sources of income.)
   What are these other sources of income? (Fishing and manufacturing industry.) In fact many Japanese farmers near the sea combine

fishing with farming since farming yields but a low income. The physical map shows that most lowland is in any case in the coastal areas.

Written Notes

The importance of the fisheries of Japan might be noted as well as the reason why so many Japanese turn to the sea rather than to farming for a living.

Discussion and Instruction

6. The next step is to find out how it is possible for fishing to take place on a large scale. An examination of a map showing the principal fishing grounds and catches would show that:
   (*a*) Some fishing is done on a large scale by ocean-going vessels—trawlers, and seine trawlers in the East and South China Sea. This evidence could be reinforced by a photograph of such a trawler.
   In addition, the Pacific, Atlantic and Indian Oceans are patrolled by tuna fishing vessels, whilst whalers go to the Antarctic Ocean.
   (*b*) Much fish (about half the total catch) is caught in the seas immediately surrounding Japan. Small boats are used (show picture). The class could tell from the map and pictures what types of fish were caught locally. (Mackerel, squid, sardines, sole.)
7. By a re-examination of the physical map it could be shown that the conditions favouring fishing are:
   (*a*) An area of continental shelf (relatively shallow seas).
   (*b*) Warm (Kuroshio) and cold (Oyashio) currents which favour various types of fish.
   (*c*) Indented coastlines providing good harbours.
   (*d*) Areas of very shallow waters or banks where fish abound.
8. Since the Japanese rely very much on fish as a source of food (protein), fishing in the past has been intensive around Japan. What is a possible danger of intensive fishing? (Over-fishing certain areas, so that the natural reproduction does not make up for the loss caused by fishing.) If fish are to be allowed to multiply, which fish should not be caught? (Those which have not yet grown to maturity.)
   How can the catching of young fish be prevented? (By insisting that nets used in fishing have large enough mesh to allow small

fry to get away; also by the imposition of a closed season in certain fishing grounds.)

In some cases it may be possible to set up breeding pools, e.g. for clams, oysters, and certain fishes, where a positive contribution is made to the development of marine products.

Written Notes

Pupils should write notes to record:

(*a*) What are the main types of fish caught by Japanese fishermen and where?

(*b*) What differences are there between fishing off the coast of Japan and fishing in far-off seas?

(*c*) In what way—

(i) the continental shelf and shallow banks
(ii) warm and cold currents
(iii) an indented coastline

favour the fishing industry.

(*d*) How the very success of the Japanese fishing industry presents a problem for future fishermen and how a policy of conserving and developing the resources of the seas is being carried out.

Fourth lesson

A COFFEE PLANTATION IN BRAZIL (Fazenda Chapadao)[1]
(for pupils aged 13 or older)

Aim

To study conditions relevant to coffee growing in Brazil and other parts of the world.

Equipment

Figs. 35 (*a*) and 36 (*b*); atlases or wall-maps of Brazil; pictures for projection, if any are available.

Method

Questioning and Instruction

Fill in the answers

1. How many miles is the Fazenda from north to south? .....
2. Name a place that is about the same distance from your school. .....
(A place known to the class)

1. Dr Gladys Hickman has written this study.

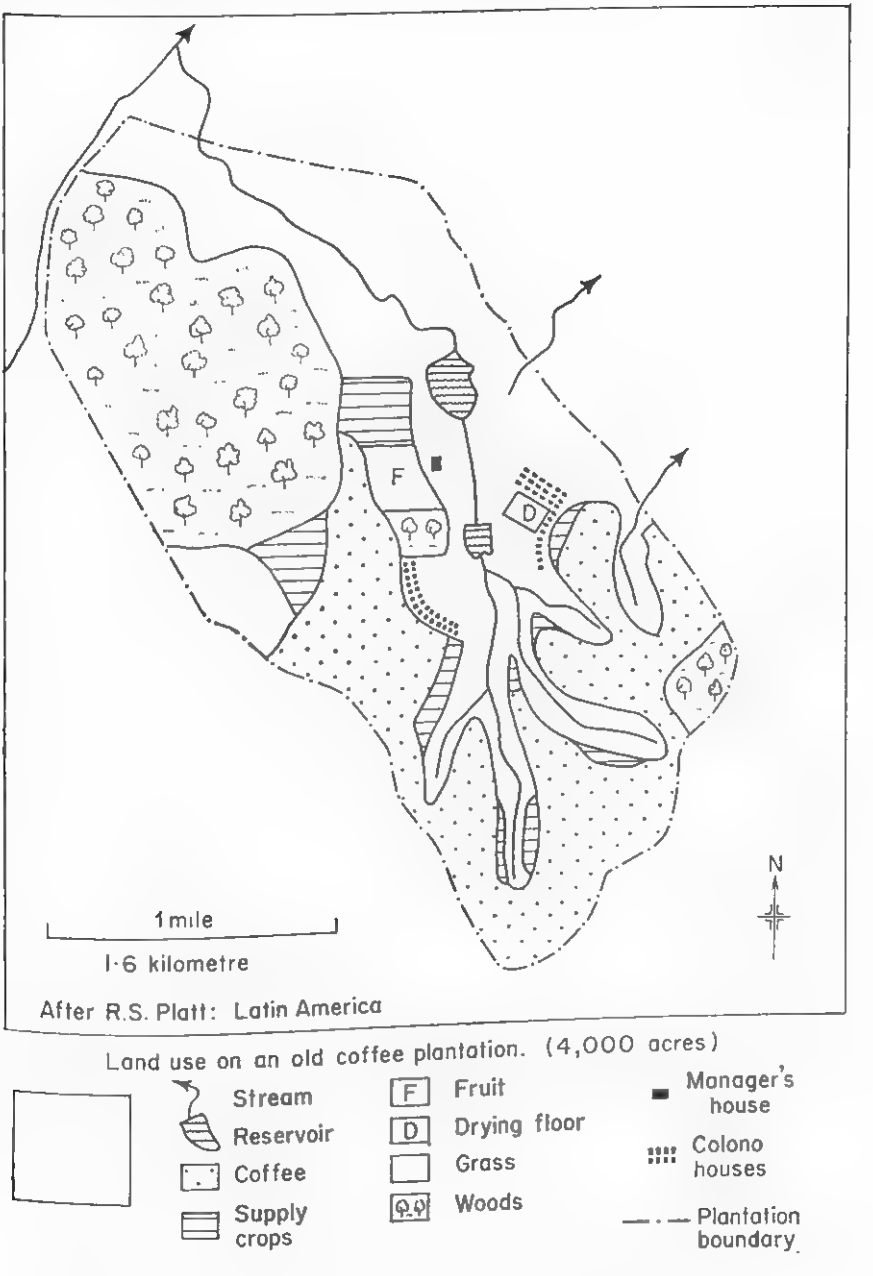


Fig. 35 Fazenda Chapadao, Campinas, Brazil. A coffee estate

3. Does the land slope *down* towards the north or towards the south?
   .....
4. How do you know? .....
5. Is this slope towards or away from the equator? .....
   (Use an atlas.)
6. How much of the fazenda is covered by coffee trees? .....
7. On which land of the fazenda is coffee grown? .....
   (or on 'which *kind* of land,' or 'where . . .')
8. On which ground is coffee *not* grown? .....
   (or, 'Is coffee grown in the valleys?' or '. . . by the streams?')
9. Are shade trees needed for the coffee trees? .....
10. What do these factors tell you about the needs of coffee for good growth? .....
    (Special reference to temperature inversion and cold air in valleys)
11. What covered the hills before the coffee was planted? (Woods.)
    .....
12. Why is reservoir water needed? .....
13. What are the supply crops used for? .....
    (To feed labourers.)
14. What does 'manager's house' suggest about the owner? .....
    .....
    (He does not live permanently on the plantation.)
15. How might the coffee reach a market from this Fazenda? .....
    .....

These questions and others on the diagram may be used to introduce the subject. It is obvious that not all the information can be found there;[1] the rest can be supplied by the teacher, for example on soils. But however successfully one deals with the diagram, to finish the teaching here would be failure.

The scrutiny of a diagram or other source material is not an end in itself; it must be extended to complete the study in whatever way is most helpful to the class. This is the basic feature of the method; it must be stressed that this one plantation, or oasis or other study, is typical of a much larger area or region; in other words, that it is a sample or type study. The sheet of diagrams, Fig. 36, suggests ways of making this extension:

It locates the coffee region of Brazil on part of the Brazilian Plateau, one of Brazil's three main regions.

1. For further information consult R. S. Platt: *Latin America; Countrysides and United Regions*, New York, McGraw-Hill, 1942.

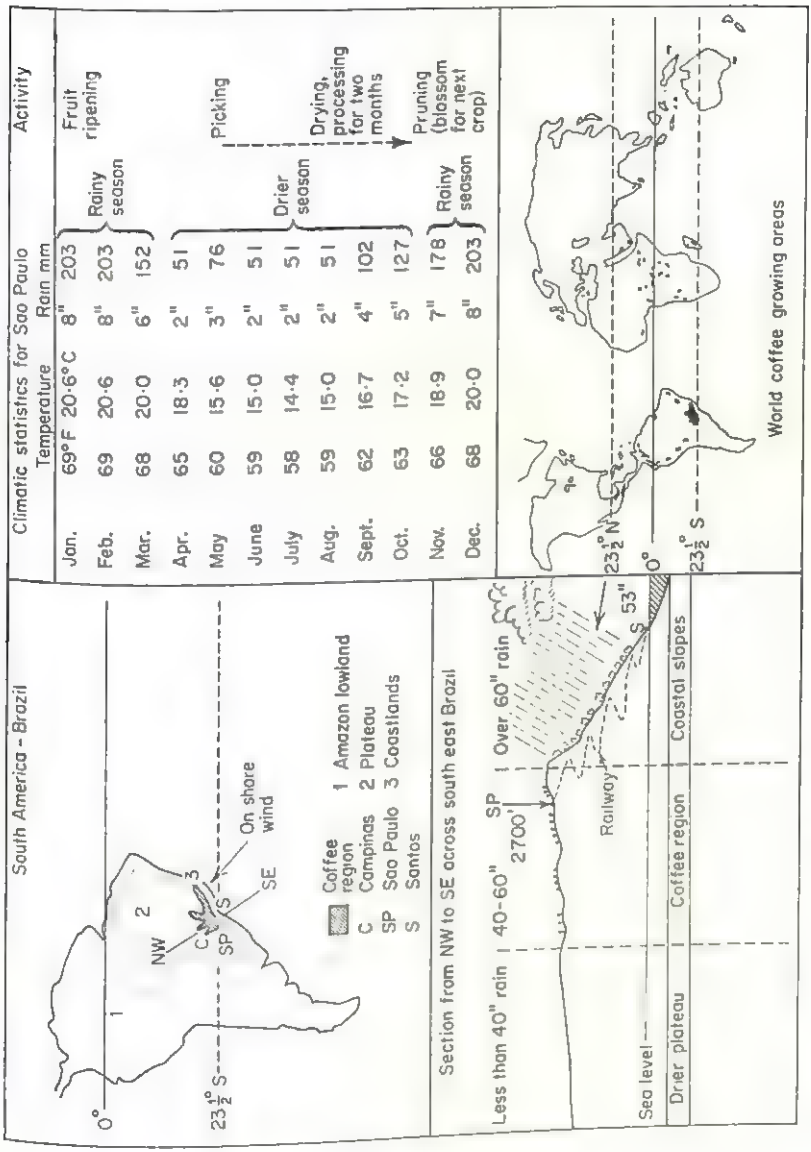


Fig. 36 Coffee-growing in Brazil—development material

The section (transect) emphasizes position with regard to the coast and export routes; and the relationship between relief and rainfall and vegetation.

A map of the world coffee-producing areas may suggest a discussion of their relative importance, and the need to consult statistics.

By way of contrast to the large plantation a study might be made

of small-holding coffee production in Buganda or among the Chagga of Mt Kilimanjaro because of its importance as a cash crop on African small-holdings and in co-operative farming. (See G. M. Hickman and W. H. G. Dickins: *Lands and People of East Africa: a Certificate Geography*, London, Longmans, 1961.)

The use of written passages from travel books

Often a writer who has experienced a particular phenomenon, for example the breaking of the monsoon in India, can give a vivid description of the phenomenon which surpasses anything the teacher can do. However, the teacher must be satisfied as to the accuracy of the passage he is quoting. In such a case, the teacher can do no better than illustrate what he means by reading out the passage.

Such a passage is given below:

Extract no. 1

THE BREAKING OF THE MONSOON[1]

'A day came when . . . it seemed as if all the dust between Patchperwa and the Bay of Bengal went swirling round the Happy House. The wind pushed Din Mohammed at a run as he brought the breakfast dishes, swathed in towels to keep the sand out. All day the wind kept blowing. Toward night it died down and the stars came out. We sniffed a strange delightful smell—moisture far off. Some hours later I was wakened by a dull roar. In a few minutes the trees were dripping . . . The temperature went tumbling down to unfamiliar coolness. By morning I found myself staring with unbelieving eyes at the reflection of the mango trees in the moat surrounding my hill. The road had been transformed into a lake and half the fields were submerged. The next night the frogs were singing persistently. Though it was only the twenty-ninth of May, two weeks too early, the Monsoon had definitely broken.'

Sometimes an extract from a travel or even a fiction story may give much valuable information of a geographical nature. One way of using such an extract is to have it duplicated, and write up on the

1. Gertrude Emerson: *Voiceless India*, rev. edn, New York, The John Day Company, 1944, pp. 229–35.

chalkboard a number of questions the answers to which the children will find in the extract. When the answers have been copied into their notebooks by the pupils, the teacher and the pupils can discuss the implications of these answers.

For example, the following passage could give rise to the questions printed below it:

Extract no. 2 (arranged in four parts)

RICE CULTIVATION IN INDIA[1]

1. Almost everybody in the village is a peasant (a *ryot*). Let us find out what sort of 'holding' the typical peasant has. This is what Gertrude Emerson writes: 'When I asked Gomti Prasad (the village accountant) the average size of a tenant's holding in Patchperwa, he did not know. Together we worked it out from his records. It came to a trifle more than six and a half acres. . . . But the figures turned out to be deceptive. If the six tenants who cultivated 20 acres were left out, 58 of the total number of 112 tenants had less than three acres, and 49 out of these less than a single acre apiece.'

2. Unlike farms in England, the holdings are not enclosed by hedges or fences. Consequently, it is not unusual for disputes to occur between tenants as to where the boundaries of each plot actually are. After all, a square yard is of great importance to a man who has only three-quarters of an acre on which to grow his family's rice. Near the beginning of June, all wrangling and quarrelling over the fields and their boundaries stops. There is more important work to do.

Gertrude Emerson continues, 'From the veranda I watched the humped white bullocks with slanting, coal-black eyes being driven out to the fields. Men carried their ploughs over their shoulders. The village had come to life.

'Fields can be prepared for rice planting only when the rain softens the hard earth. Since the growing season is short, there is little time to waste. First of all the seed beds were carefully ploughed and reploughed. Then attention was turned to those fields where the rice was later to be transplanted . . .

'Work was in full swing. Pairs of bullocks were going round and round the field, each pair followed by a ploughman steadying the single handle of his plough. Knee-deep in the . . . water the plough-men worked, bare bodies thickly splashed with mud. Two to four pairs of bullocks tramped round and round, one behind the other.

1. Emerson, *op. cit.*, pp. 230–5.

The man with enough land to require several bullocks turned them all into one field at a time, drawing upon relatives or hired ploughmen to help out, but ordinary villages pooled their resources, for general convenience, ploughing the fields of each in turn. Where the ploughing was finished and the churned mud had already sucked up most of the water, the men, two abreast, were standing behind their bullocks on boards and driving round the fields like Roman charioteers, pressing the ooze with their own weight.'

Then, in fields which had been fully prepared, '(the sower) moved slowly forward, scattering seed from a basket held against her breast.'

3. 'Three weeks later the rice was two feet high and ready for transplanting. This was another period of feverish activity. . . . The older men and some of the women swept it up in big handfuls from the seed beds and tied it in bunches with a quick twist of one or two long fresh blades. As soon as a stack was ready, one of the women set off for the outer fields with a towering green pile on her head.'

Then comes the planting of the young rice shoots into the paddy fields. '. . . The fingers of women are more deft than those of the men, and women did this work. They were strung out in long bending rows, saris tucked well up out of the water. A man on the dike at one corner of the field tossed small bundles of rice plants to them. Separating the plants, they thrust two or three at a time in the muddy bottom, with quick regular gestures like oar strokes, leaving a space between each upright tuft. Under my eyes the field took on a quaintly quilted look.'

4. 'Each worker is supposed to transplant four pounds of rice plant a day, but the day may be a very long one. He (the watchman of the village) himself often worked in the fields by lantern light. Then he walked a long way home, ate a handful of food, and fell asleep, and was up again at four. If it was raining he felt chilled. Everything was damp outside and in, including the mud floor on which he slept. His body ached. Sometimes he had fever. If the sun shone . . . in the open fields, the cultivator had nothing but a few rags between himself and the furnace overhead. Inured to the sun by centuries though he is, he suffers greatly.'

Questions

1. What was the average size of each peasant's holding?
   Why was this figure not truly representative?

2. Why do disputes often occur about the boundaries of a holding? Why does this quarrelling stop at the beginning of June?
3. Describe the way in which:
   (*a*) the fields are prepared;
   (*b*) the rice is sown in the nursery fields;
   (*c*) the rice is transplanted to the paddy fields.
4. Who does the ploughing and who does the transplanting?
5. What suggests that the life of an Indian peasant can be very hard?

This then could lead the teacher to discuss the pressure of population on the land in India. This could be done by pointing out the absolute size of the population in India and its rate of growth each year. If pupils are asked to observe on the map how the population is distributed in India, they will find out that the density is greatest in the Ganges valley and along the western and eastern coastal regions of the peninsula. The question would arise as to why this pattern of distribution existed.

At this stage a discussion of the geographical factors influencing population distribution would follow, namely: (*a*) the influence of relief and the availability of low flat land and alluvial soils as in the Ganges valley; and (*b*) the influence of rainfall, the greater densities of population corresponding approximately with the areas of greater rainfall, except in the mountainous areas. This would lead to a realization that population pressure is greatest in the favourable areas, and that if population growth continues, either the size of individual land holdings will get smaller, this being undesirable economically, or many people will have to work elsewhere than on the land.

In the light of this argument, the Indian economic plans to develop industry could be pointed out as a means of providing employment for landless Indians and as a means of raising the productivity of the land, for example by producing fertilizers and modern agricultural implements. A warning might be given that such economic progress is slow at first, owing to the enormous amount of capital and time required to set up an industrial plant, and to the fact that while this is being done, the population continues to increase.

The teacher would, of course, present the lesson in such a way that most of the matter learned by the pupils could be obtained from them by questioning. Thus the teacher would require to have available statistics of the population of India, the annual population increase, a map of the distribution of the population, a map showing the relief and one of the rainfall distribution of India.

Another passage which might be useful, this time as a means of

providing realistic background for certain aspects of physical geography, is given below.

Extract no. 3

THE FIRST BIG HURDLE—THE ICE-FALL[1]

'The Khumbu ice-fall has been eloquently described by previous expeditions as the most dreaded hurdle. To negotiate this, mountaineering technique of the highest order, particularly of snow and ice craft, was absolutely essential. It called for hard work, perseverance, guts and determination from practically every member of the team, including the Sherpas, because over this hazardous route we had to transport nearly two tons of equipment and stores for the camps at higher altitudes.

'As we drew near the ice-fall we were able to see its magnitude and chaotic condition. We went through a number of gullies and climbed steep slopes. The marker flags which had been put up only two or three days ago seemed to have shifted in some cases. One or two of them were deep in crevasses where they had landed after a shift of the ice. The sun shone fiercely and both Lakpa and I had to take off our jerseys. The glare was intense and we were perspiring profusely. We crossed nearly forty crevasses of various sizes. Most of these could be jumped across, but there were eight or nine which were bridged with logs of wood or ladders. In a number of places there were vertical ice walls studded with rope or wire ladders. At one place we had to cross a wide crevasse and then climb a steep face on the far side. There were no footholds on the ice wall on which a rope ladder had been firmly fixed from the top of the wall. As I stepped on the rope ladder, it swung directly above the abyss and hit the wall. After that the climb was quite easy, but it was a frightening experience.'

This extract from the record of an Indian Himalayan expedition tells of the difficulties encountered in the Khumbu ice-fall. This ice-fall must be negotiated before climbers can get into the Western Cwm, a semi-circular cirque or corrie, which collects all the snow which falls between the high ridges (on which Everest stands) which all but surround the cirque. As the snow packs into ice in the Western Cwm and as the quantity of ice increases, so some of it is forced out of the Cwm and tumbles down into the Khumbu Valley. This process, how-

1. Gyan Singh: *The Lure of Everest*, New Delhi, Ministry of Information and Broadcasting, 1961, pp. 101–6.
This extract was provided by Professor S. P. Chatterjee of the University of Calcutta.

ever, is slow and sometimes imperceptible, but occasionally the movement of the ice is sudden. The result is a tumbled mass of ice blocks, seracs and crevasses over which climbers must pass.

The pupils might, during a course of lessons on either glaciation or on the Himalayas, be asked to read the above passage (or a similar one) carefully.

Questions

Questions might be put such as the following:

1. What evidence is there in the passage that the ice in the ice-fall does in fact move?
2. Does the ice move smoothly and evenly?
3. What happens when two blocks of ice next to each other do not move at the same rate?
4. Are crevasses few in number? Are they mostly the same size?
5. Although the ice-fall is high up in the Himalayas (18,000–22,000 ft —6,000–7,000 m), what can the weather be like when the sun is shining?

Such questions raise further questions and depending on the age of the pupils the teacher may consider topics such as variations in temperature between night and day at high altitudes, the formation of glaciers, moraines and frost action. The important point to realize is that such passages from literature or from travel books act as a stimulus to learning, since they provide firsthand information linked to a narrative, and this proves attractive to most pupils. Consequently there is no set way in which they may be used. They may provide an arresting introduction to a topic, or simply a clear illustration in the process of a lesson, or even an attractive conclusion.

The use of statistical information

Information obtained from published statistics can often be used in geography lessons. The statistics may be used in two ways:

1. In a raw form as evidence of a statement being made, e.g. a table of the major world producers of petroleum showing how much petroleum is produced by each country to back up a statement that, say, some of the major producers of petroleum are located around the Persian Gulf.

2. In a 'processed' form in order to elucidate certain information of a geographical nature, e.g. the working out of average population densities by dividing the total population of a country by its area, or

finding out the average income per head of the population by dividing the national income by the total population.

True comparisons between countries are sometimes valid only if the crude statistical information is manipulated to take into account differences in area or differences in population.

The processing of the crude statistics can itself be a valuable exercise for pupils. Further, much crude statistical information may be presented in graphical or pictorial form. This is particularly useful for the younger and less able pupils who find it easier to deal with quantitative information in a pictorial form.

Statistical information may be obtained from many sources: government publications, private firms and international organizations.[1] The teacher should make himself familiar with some of these sources, and be conscious of their limitations. Children are apt to believe that anything which is printed is *ipso facto* the absolute truth. To counteract this, the teacher might point out that even official statistics are sometimes nothing more than very approximate estimates. Further, statistics get out of date rapidly and it is necessary for the teacher to bring them up to date fairly frequently, say every three years.

Practical work in the classroom

Of course all work done by the pupils is in a sense practical. It involves observing, thinking, writing, counting, drawing maps, sketching, making graphs on squared paper, labelling and so on. There are occasions when it may be useful to make models. It is suggested that such exercises should be undertaken when:

(*a*) the model will greatly help the understanding, for example, of a relief feature. This method of teaching would be of use to average ability classes, where a too abstract approach begins to lead to boredom;

(*b*) a class has been working, in an academic sense, under pressure, and the making of a model breaks into the routine and affords some relief;

(*c*) it is desired to put up some sort of exhibition to illustrate a geographical study made in the classroom or in the field. A model is always an attraction in an exhibition.

Model building is a time-consuming occupation, and it is necessary to limit one's ambitions in this field, and to suggest to the pupils that

1. See Chapter 8.

much of the work might be done at home. Apart from relief features, models may be constructed of a Zulu kraal, of a Pygmy encampment, of a desert oasis settlement, of an Indian village and so on. The materials which may be used for this are balsa wood, papier-mâché, Plasticine or a cellulose adhesive plaster. In practice, the choice of constructional materials depends first on what is available locally and secondly on the type of model to be built. For example, if a simple relief model is to be built based on a contour map, then cardboard, hardboard or plywood may be employed.[1]

If a large model of a relief feature is to be made which is not based on a contour map, for example, a model of a geological basin, then such materials as moulders' sand, clay, plaster of Paris, cellulose plaster, Plasticine may be used. It is essential to have a firm base of solid wood on which the model may be built. When the required shape has been achieved, it may be necessary with some materials, such as sand, to harden their surfaces by the use of a fixative such as diluted gum arabic. When the model is dry, oil paints may be used to depict both surface and geological features. It is not possible here to go into all the details of model building.[2] Suffice it to say that many teachers have found models a useful asset in the classroom for teaching purposes and in stimulating interest in a geographical topic.

Tests and examinations (the evaluation of teaching)

It is necessary to check from time to time the effect of one's teaching. This can be done orally, as is done in France at the beginning of each lesson when the work of the previous lesson is the subject of questions put to certain pupils in the class. This method, which may be useful in certain circumstances, may be inefficient, since only a few pupils can be tested at one time. A better method is to give a ten-minute written test in which all the pupils have to write on a piece of paper the answers to ten or perhaps twenty short questions. For example, the results of the lesson on Malaya (see page 76) might be tested by asking for short answers to the following questions:

Short test on the lesson on Malaya

1. In what part of Asia is Malaya? (South-east.)
2. Which country lies to the north of Malaya? (Thailand.)

1. See Fig. 40 in Chapter 5 to learn how to build such a model.
2. On this topic see: T. W. Birch: 'Constructive and creative work in Geography', *Geography*, vol. XXVIII, part I, March 1943, pp. 19–25. T. Bailey: *The Craft of Model Making*, Leicester, Dryad Press, 1960. A. T. White: *Modelling Relief Maps*, Leicester, Dryad Press.

3. Which island lies south and west of Malaya? (Sumatra, part of Indonesia.)
4. In what area of Malaya is there the greatest density of population? (In the west.)
5. Name two towns which lie in this part of Malaya. (Penang, Kuala Lumpur, Malacca, Port Swettenham.)
6. What is Malaya's main export? (Rubber.)
7. From what plant is this commodity obtained? (From a tree—*Hevea brasiliensis*.)
8. What climatic conditions, of temperature and rainfall, enable this plant to thrive well in Malaya? (High temperatures, monthly average around 27° C (80° F); and high rainfall, about 2,770 mm (109 in) per year.)
9. Name two peoples who immigrated into Malaya to work there. (Indians and Chinese.)
10. Which of the two groups is the more numerous today? (The Chinese.)

The questions are given orally by the teacher, the answers written down on a slip of paper by the pupils. The pupils may then exchange their slips of paper and correct each other's answers as the teacher reads out the correct answers. At the end of the checking the teacher can take down the mark or score out of ten and see whether most of the class have remembered the essential facts of the lesson.

Tests, however, should not only be on facts which have been memorized, but they should also test the pupils' abilities to use a globe, an atlas, a textbook, a map, a cross-section (profile), a graph or a diagram. In other words, tests should check that pupils not only have factual knowledge, but also have the necessary skills which will enable them to obtain and use factual knowledge. Some examples are given below:

Test on the globe

1. At what two points on the globe do lines of longitude meet?
2. Through what countries does the equator pass:
   (*a*) in Africa,
   (*b*) in South America?
3. In what direction would you travel if you journeyed from Winnipeg in Canada to Tomsk in the U.S.S.R. by the shortest route?
4. Which hemisphere has the greater amount of land within it?

5. Are there any landmasses between the two points 0° latitude, 150° W longitude, and 0° latitude, 90° W longitude?

Test on the atlas

1. From the index of your atlas, find the latitude and longitude of Asuncion (Paraguay).
2. Look up the correct page of your atlas and find Asuncion. On what river is the town situated?
3. What tributary river joins the main river near Asuncion?
4. Is Asuncion in a plain or a mountainous area? What area of Paraguay is highland?
5. Is Asuncion close to or a long way from the frontier of Paraguay?
6. What country lies to the west of Asuncion?
7. Look at the scale of your atlas map and work out how far Asuncion is from the tropic of Capricorn.
8. What methods of transport can be used to reach Asuncion from Montevideo?
9. Is it possible to travel due north to Brazil by railway from Asuncion?
10. What name is given to the north and west of Paraguay? Is there any evidence that this area is densely or sparsely populated?

The answers to these questions may be obtained by the use of an ordinary school atlas. In the above case they were composed by using Philip's *Modern School Atlas*.[1]

Test on graphs

The two graphs illustrated in Figs. 37 and 38 are taken from two school textbooks of geography.[2] Printed below are a number of questions which could be asked about these graphs so that useful geographical information may be obtained.

1. Is the flow of the river Nile regular all the year round?
2. During what months of the year is the flow of the Nile fairly steady?
3. What is the approximate rate of flow per second when the flow is fairly steady?
4. During what month of the year does the rate of flow rise to a maximum?

1. H. Fullard (ed.): *Modern School Atlas*, London, George Philip & Sons, Ltd, 1959.
2. R. C. Honeybone and M. Long: *Geography for Schools*, London, Heinemann, book v, p. 232, and R. C. Honeybone and B. S. Roberson, book II, p. 22.

5. What is that maximum rate of flow?
6. During what months does the rate of flow remain high?

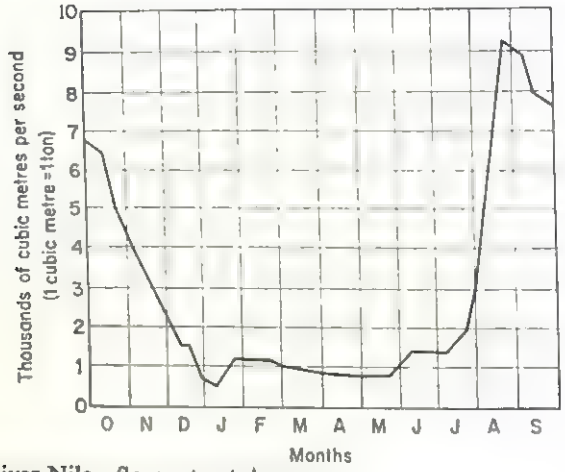


Fig. 37 River Nile—flow rate at Aswan

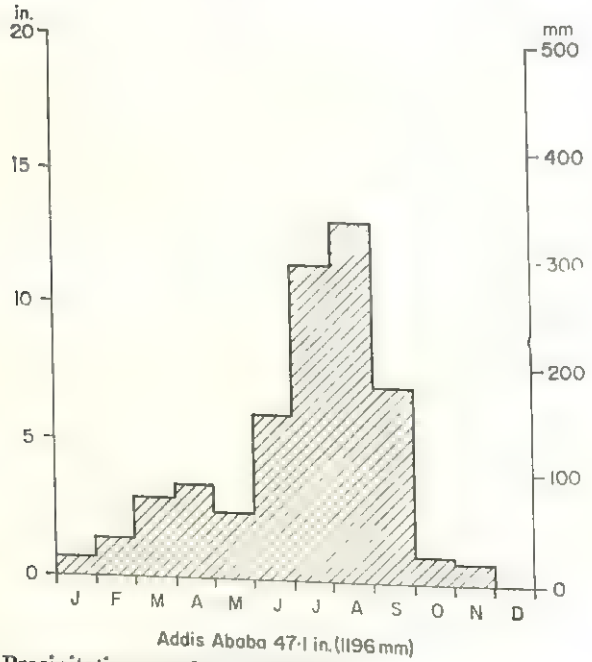


Fig. 38 Precipitation graph—Addis Ababa

1. During what months of the year is the rainfall below 125 mm (5 in)?

2. During what month of the year does the rainfall tend to increase rather suddenly?
3. What is the month of maximum rainfall?
4. When does the rainfall fall to below 125 mm (5 in) again?
5. Compare this graph with that of the flow of the Nile. What similarities do you notice?
6. Why does the flow of the Nile not rise until some time after the rainfall in Addis Ababa has started to rise?
7. Write a short statement on the relationship between rainfall in the Ethiopian Highlands and the rate of flow of the river Nile at Aswan.

Completion test (for pupils aged 13)

Filling in missing words in a passage, filling in blank maps, drawing graphs from given data: all these methods may be used with classes which have difficulty in expressing themselves verbally.

In the following example the words in italics would be missed out.

The flow of the river Nile at Aswan is irregular. From January to (*June*) it remains at around (*1,000*) cubic metres per second. In the month of (*July*) the rate of flow begins to rise reaching a maximum of just over (*9,000*) cubic metres per second in the month of (*August*). From September, the rate of flow falls, until in (*December*) it is again around 1,000 cubic metres per second.

The increase in the rate of flow corresponds to an increase in (*rainfall*) in the area of the Ethiopian Highlands where Addis Ababa is situated. The rise in the flow of the Nile, however, occurs (*later*) than the rise in the rainfall in the Highlands because it takes some time for the Nile to collect water from its (*catchment*) area.

It is assumed that the necessary information and vocabulary will have been taught in a previous lesson.

The Multiple Choice factual test

In this type of test the pupil is asked a question and several alternative answers are suggested. It is up to the pupil to pick out the correct answer by underlining or ticking it. Some multiple choice test questions of a factual type are given below and are suitable for 12-year-old pupils. (The correct answer is in italics.)

1. The line of latitude which is exactly halfway between the north and south poles is known as: the tropic of Cancer, the *equator*, the Arctic circle, the tropic of Capricorn, the Antarctic circle.

2. The Greenwich meridian is also known as: 180° longitude, 90° W longitude, 90° E longitude, *0° longitude*, 45° E longitude.
3. The sea between China and the Philippine Islands is known as: the Arabian Sea, the Timor Sea, *the South China Sea*, the Sea of Japan, the Sea of Okhotsk.
4. The continent which is wholly south of the equator is: South America, Africa, Asia, *Australia*, Europe.
5. Madagascar is an island: in the Arctic Ocean, in the *Indian Ocean*, in the Pacific Ocean, in the North Atlantic Ocean, in the South Atlantic Ocean.

The Multiple Choice 'reasoning test'

Here an attempt is made to see how far geographical and other relationships have been understood.

YAFELE'S KRAAL (see Sample study no. 2, p. 96)

1. Men do not work full time on the land because: they are not born farmers, they prefer working in factories, they do not know how to work the land, *they have not enough land to keep them busy all the time*, they have no land.
2. Farming is not very efficient because: the rainfall is too high, the temperatures are too low, *the land is subdivided into very small patches*, the farmers do not know how to till the soil, the wind is very strong.
3. The yield of the land is low because: *there is a lack of fertilizers*, the land is at too high an altitude, the climate is too cold, the rainfall is insufficient in the rainy season, the wind has blown much of the soil away.
4. The productivity of the land is also low because: cattle trample the crops, the women and children are not used to work in the fields, the locusts settle on the land every year, disease destroys part of the crop annually, *maize is too often grown in the same field year after year.*
5. The number of cattle which the village is allowed to keep is limited because: *there is a shortage of pasture in the Savanna*, cowherds are hard to find, cattle spread sleeping sickness, too many cattle would be dangerous for children.

Factual map test (for pupils aged 14)

This involves putting information on an outline map on which certain features have been drawn and others omitted. For example, on

the outline map of Italy (Fig. 39) the following instructions might be given:

1. Print in the correct places the names of the following islands: Sicily, Sardinia, Corsica, Elba.

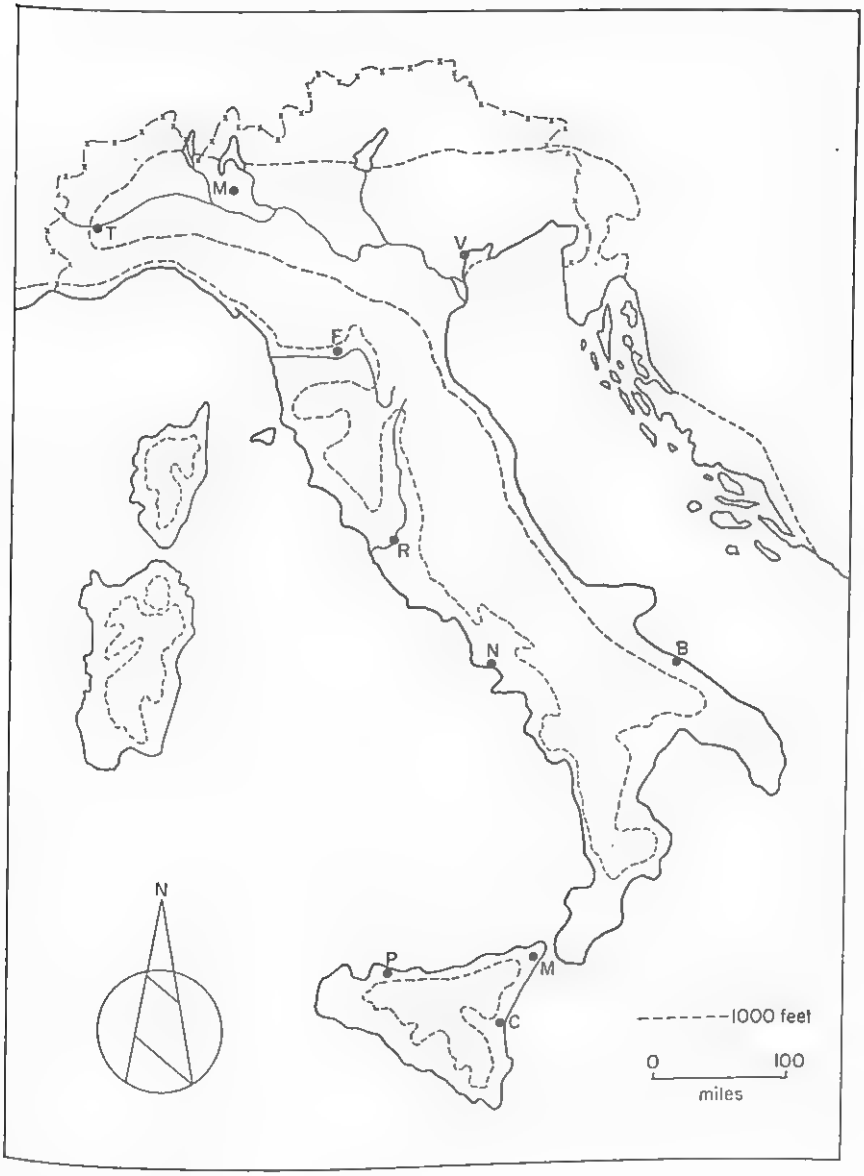


Fig. 39 Italy

2. Print the names of the towns whose initial letters appear on the map.
3. Print in the correct places the names of the following seas: Adriatic Sea, Ligurian Sea, Tyrrhenian Sea.
4. Shade the land over 1,000 ft (300 m) and print the names of the following mountains in the correct places: Apennines, Alps.
5. Print the names of the following rivers alongside the correct rivers: River Po, River Tiber, River Arno, River Ticino, River Adda.

Even with able children, a subject like geography must be in part tested by means of maps. It is therefore suggested that any examination should include the following items:

1. An exercise on a large-scale map. (See the lesson using large-scale maps, p. 39.)
2. Completion of outline maps (see map of Italy, Fig. 39).
3. The testing of factual knowledge.
4. The testing of the ability to interpret knowledge, through the presentation of related facts, to see whether the pupil is able to understand the relationship. Some facts have, of course, to be known. A number of examples are given below.

Examples of relationship tests

1. CLIMATE (for pupils aged 16)

The following records of the mean monthly temperatures and mean monthly rainfalls are for two places A and B, both in latitude 40° N (approx.).[1]

A. *Altitude 30 m (98 ft)*

	J	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*O*	*N*	*D*
Temp.												
°C	11·5	10	10·5	12	15·5	19	23	25·5	26	23	20	15
°F	53	50	51	53	60	66	74	78	79	74	68	59
Precipitation												
mm	152	152	102	76	51	25	0	25	88	152	229	254
in	6	6	4	3	2	1	0	1	3·5	6	9	10

B. *Altitude 39 m (131 ft)*

Temp.												
°C	−6	−1·5	5	14	20	24·5	26	22	20	13	3·5	3
°F	23	29	41	57	68	76	79	72	68	55	39	27
Precipitation												
mm	0	6·3	6·3	12·7	38·1	76·2	241·3	158·7	63·5	12·7	12·7	0
in	0	0·25	0·25	0·5	1·5	3	9·5	6·25	2·5	0·5	0·5	0

1. General Certificate of Education Examination in Geography, 'O' Level, Summer 1959.

(*a*) For A and B state:

(i) The maximum and minimum temperature.
(ii) The period of greatest rainfall.
(iii) The climatic region in which each lies, giving your reasons.

(*b*) Why do the temperatures and rainfall at A differ from those at B?

2. ECONOMIC GEOGRAPHY (for pupils aged 15 and over)

The total production of all types of grapes used for wine-making is shared by various countries in the following way (figures for 1960 '61):

France (mainly in the south)	26%
Italy	23%
Spain	9%
Algeria	6%
Argentina	6%
Portugal	5%
U.S.A. (mainly California)	4%
Others	21%

(*a*) Considering only those countries in the northern hemisphere, what are the approximate latitude limits of grape-producing areas?

(*b*) In what world area is there the greatest concentration of vineyards?

(*c*) From this distribution of vineyards what can you deduce about the climatic conditions which are favourable to the growing of grapes? What are the historical reasons which help to explain this distribution of vineyards?

(*d*) Vineyards are often found on hill slopes and in gravelly soils. What are the reasons for this?

(*e*) The distribution of world import and export trade in wine is as follows:

	Imports		*Exports*
France	59%	Algeria	54%
Germany	15%	France	10%
Switzerland	4%	Italy	7%
United Kingdom	3%	Portugal	6%
Belgium and Luxembourg	3%	Morocco	5%
Others	16%	Tunisia	5%
		Spain	4%
		Others	9%

Between what two countries is there the greatest amount of trade? Suggest the names of two ports which handle this trade.

Which country exports and imports wine? Can you explain why this country both exports and imports wine?

3. GENERAL GEOGRAPHY

In the Republic of Indonesia much of Java has a density of population which is in excess of 200 people per square kilometre (512 people per square mile), whilst in much of Sumatra the density of population is only about 6 inhabitants per square kilometre (about 16 per square mile). What geographical factors have influenced this difference in population distribution? Give your answer in terms of:

(*a*) Relief and soils
(*b*) Climate
(*c*) Vegetation
(*d*) Economic development.

This last question would obviously only be given to advanced pupils who already have a firm basis of factual knowledge which they can use to interpret the facts given about the population densities in those two parts of Indonesia.

General conclusion

It would be vain to claim that, in this section on the techniques of teaching geography, anything but a guide has been given to the teacher who is embarking on a new journey in his career. This is a journey which implies his willingness to explore new fields, to leave the textbook to one side, at least occasionally, and not to rely too much on the technique of direct instruction (the lecture method).

Let us restate our aims. First, the pupil should develop an awareness of his local environment, in which he begins to understand the inter-relatedness of this environment. This can only be truly appreciated when the pupil has developed his observational powers by going out of school and doing field work. Secondly, there must be an approximation to this field work technique in the classroom, so that the pupil is constantly made to think about geographical relationships by being presented with evidence in the form of maps, pictures, statistics and written texts, from which conclusions may be drawn about areas in which direct observation cannot take place. If such methods are used, then a process of thought develops in which concrete images can be, in time, translated into abstract concepts which may be defined. Thus from the evidence of a busy road or railway junction comes the generalization of economic activity develop-

ing around route centres; the next step is the definition of a nodal centre.

This technique of teaching implies, as a corollary, that the precise approach to a particular lesson will be in part determined by the geographical evidence which teachers have at their disposal. In other words, in the case of a classroom lesson, the nature of the lesson will be determined partly by the maps, pictures, films, radio or television programmes which the teacher has available. This is why, while guidance may be given in a syllabus, a syllabus can never lay down precisely what to teach and how to teach it. As soon as a teacher becomes the slave of a syllabus, his teaching loses something of that living quality which makes a lesson an enjoyable experience shared by both pupils and teacher.

5 Teaching material

IN PREPARING this chapter it has been necessary to reconcile two contradictory points of view—the hopeful view to the effect that the geography teacher has or should be given—the use of a large range of teaching material of obvious classroom interest, and the pessimistic view to the effect that the very abundance enjoyed by some might be liable to discourage those teachers who have no apparatus and no specimen collections. That both views do exist has been confirmed by the divergent opinions communicated by teachers of various nationalities. Actually, the second view must be rejected. In the present chapter an attempt is made to list all the aids used in geography teaching. It is not claimed that this object has been fully achieved but one thing is quite certain, namely that the possession of all that might be wished remains an unrealizable dream for the vast majority of teachers.

Admittedly, a competent teacher would quite properly wish to have the full equipment available but, even without it, he will nevertheless be able to give excellent geography lessons. Moreover, where money is lacking it is very often possible to assemble at least a good part of the material with the help of the pupils. In a number of countries—in Poland, for instance, and in some schools in the United States—there are periods in the timetable set aside expressly for drawing maps. Again, technical training centres very often undertake the making of teaching apparatus as part of their workshop training; other items can be put together in practical physics periods. The pages that follow contain still further suggestions.

These few examples, while in no sense exclusive, indicate the nature of the present chapter: it is an attempt to suggest a list of types of material, but it is certainly not meant to restrain either the keenness or the initiative of teachers or to limit the contributions of various kinds that can be made by pupils or their parents.

Minimum equipment

The chalkboard

Whatever the age of the pupils and the standard they have reached in geography, the chalkboard remains the essential item of equipment

throughout. Its dimensions may vary (see Chapter 6) but the working surface should be as large as possible.[1]

The chalkboard and the acquisition of good habits

The teacher should write all new terms on the chalkboard. Each point observed, explained and assimilated is thus associated with a word which the child's mind will record all the better for having his visual memory brought into play. Geography cannot be studied without diagrams and sketches. The example of the teacher constantly drawing on the chalkboard will convince pupils that they themselves should learn to draw. This means that the teacher must constantly strive after neatness, order and clarity. Perfect examples will arouse the wish to do likewise and diminish the danger of muddled scrawling.

Even if the teacher has textbooks available, it pays him to do chalkboard drawings as he can then choose the sketches that best fit in with his lesson, add to them, supplement an explanation according to the particular capacities of his pupils, or adapt his lesson so as to take advantage of a local example.

The chalkboard a rewarding medium

In most countries, the teaching of geography begins with a study of the school's surroundings. This provides a solid basis of actual observations on which to build up some fundamental general concepts and the rudiments of an elementary geographical vocabulary. As early as possible, however, it is desirable to begin a concurrent introduction to the media for recording geographical data. Here again, the chalkboard is an incomparable aid.

In this connexion, the ground-plan affords an excellent introduction to the use of maps, with teacher and pupils, after first studying the ground (classroom, school, quarter), working up together from a rough impromptu sketch to a real plan to scale. By this procedure, and without costly equipment, pupils are introduced to the following notions: scale, outline drawing, accurate angles and proportions, need for conventional signs. After this comes a whole range of supplementary exercises—identification, additions of details in their correct place, calculations of distances, etc. In the same way, through

1. Letters from a number of correspondents indicate that many schools have no chalkboard. In such cases, pending the supply of one, any flat painted surface can be utilized —a wall with a flat surface rubbed down with pumice-stone, some planks joined together or a section of sheet iron.

examples drawn on the chalkboard, children can be taught the elementary rules of perspective and of diagrammatic simplification, which, far from misrepresenting things, makes them clearer because the diagrams are of things actually seen.

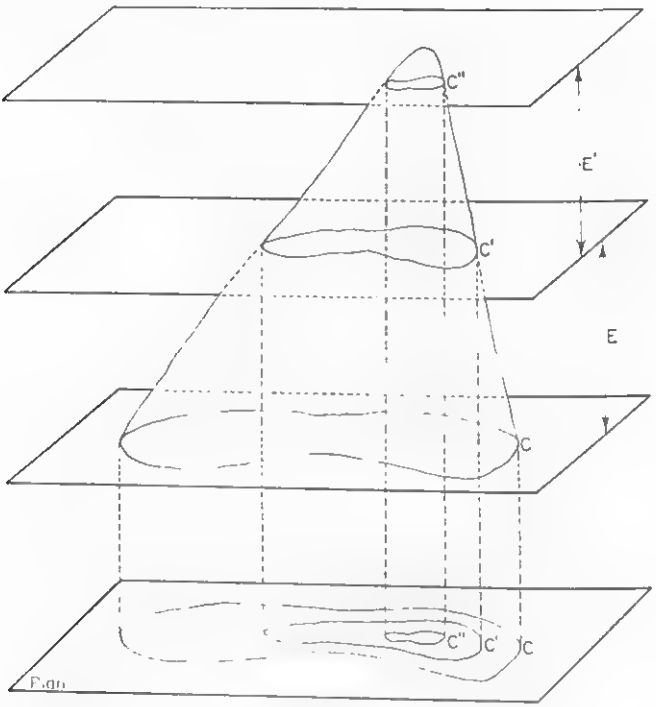


Fig. 40 Introduction to cartography

The chalkboard for geographical work

At a more advanced level, the chalkboard can still make up for inadequate equipment to some extent. With the teacher constantly working on the chalkboard in front of the class, the children will readily accept the idea that they can try to do the same thing. Some of the complicated diagrams in the textbooks have a very different effect on them. Through their simplicity of outline, chalkboard sketches lend themselves perfectly to the task of bringing out essential features and this hastens understanding.

In cartography, for instance, a teacher can give the first lessons on

the chalkboard with or without the help of maps, as Fig. 40 shows. This is a sketch of a simple relief done in perspective cut by three horizontal planes at equal distances (E and E′). From each of the curves of intersection (C, C′, C″) a vertical dotted line is dropped to the plane at the foot of the sketch. By means of such a sketch on the chalkboard, it is easy for the teacher to show what contours are, and what is meant by their equidistance, and also what altitude figures mean. He will then have prepared his pupils for understanding the representation of the relief by hachures without contours.

Later, maps will be used if available, but it is still wise after giving a lesson from a map to give a kind of cartographic summary of it by simple chalkboard sketches. In some instances, it will be useful to fill in the sketches as the lesson proceeds.

Constant use should be made of perspective sketches, such as cross-sections, conventional representations and outline diagrams, drawn to scale or simplified, provided, however, that these do not become mere abstractions. Clean-cut lines will suggest concrete reality. The teacher who is accustomed to using the chalkboard rapidly acquires the indispensable art of cutting out all minor details which would distract attention and obscure the essential lines of the sketch. Even in climatology, the chalkboard is an enormous help. If arrangements have been made to have temperature and pressure readings collected, adequate illustrations can be given of the nature of means, isothermic maps and isobars. Finally, pupils themselves must be given frequent opportunities of using the chalkboard, as suggested in the previous chapter.

The chalkboard can make the teacher's work very effective and, if he uses it in conjunction with the sources of information available to him, he will find that his pupils grasp his lessons more easily. Method and clarity are essential. Chalks of various colours should be used, with each colour always meaning the same thing. In this way, excellent geography lessons become possible.

Pupil's notebooks of lessons and practical exercises

Even though the traditional use of the notebook has been abandoned in some countries, it is, in the writer's view, still useful, if not essential, for teaching geography at primary and secondary level. As far as possible, juniors should use bound notebooks so that they do not lose pages or insert them in the wrong order. Loose leaves or sheets in a binder will be more suitable for pupils of secondary schools.

Some teachers favour a single notebook containing both class notes and exercises. This has the advantage of providing an orderly arrangement as field work notes and maps are thus inserted at the proper points in the course. For his personal work the pupil will have all his material in good order and readily available. He can, for instance, write on one page and draw the corresponding sketch on the page facing it.

On the other hand, it is equally practicable to keep separate classwork and practical work by giving each pupil two notebooks. There are even special notebooks for practical work interleaved with drawing paper or graph paper, but these are not essential.

For juniors, the class notebook will consist of summaries of lessons, but it is quite unnecessary for this notebook to become a second textbook. It is enough for the pupil to note, with each summary, the additional information given and the local examples observed, together with any useful notions not mentioned in the textbook. For older pupils, a more detailed summary can be given so that the notebook will be more complete. In some countries, towards the end of the second cycle of the secondary school (15 to 18 years), pupils make a start at taking notes for themselves, giving an accurate account of the lesson.

There should be plenty of practical exercises, for these give extremely valuable training. To begin with diagrammatic maps, there are various practical but not universally accepted methods such as the attempt to conventionalize the mapping with the help of geometrical constructions: lattices, polygons or grids (for example, the grid formed by meridians and parallels, or others of a conventional nature). The object of all these methods is to make it easier to produce a correct drawing. It is sometimes objected that they do not accurately represent the outline. But do not different projections give different outlines? A pupil who draws large numbers of maps acquires invaluable descriptive data, a wealth of geographical terms and good aptitudes for localization. It is merely necessary to make sure that these cartographic exercises remain simple and serve to illustrate only one geographical fact at a time, without complicated drawings or tintings. If they are treated in this way, the only material required for mapping exercises consists of paper, pencils and a graduated ruler.

Apart from map-making, the range of practical exercises in geography is extremely great—sketches of all kinds, vertical sections, cross-sections, graphs prepared from statistics, numerical exercises, analyses of texts, map reading, reports of group studies made on the ground or from photographs. All modern textbooks suggest lists of

such exercises and there are also books of practical exercises adapted to each age group, which contain a veritable anthology of exercises that can be helpful to the teacher.

Experience shows that all these exercises make it necessary to have fairly bulky notebooks but the benefit derived is considerable, more especially as the pupils' individual work has to be checked regularly by the teacher.

Textbooks

It is highly desirable that each pupil should have his own copy of the textbook prescribed or recommended by the school authorities, as it ensures his having information and explanations in permanent form and makes it possible for him to do his personal work efficiently and in his own time. Textbooks can be divided into three categories.

(*a*) *Conventional textbooks*

These give a complete account of each subject studied. Each chapter is complete in itself, with examples, and incorporates its own source material. The argument is set out in logical order, and the conclusions are drawn. In appendices, there are relevant texts, suggestions for personal reading, statistics, and subjects for practical exercises. The main disadvantage of this type of book is that it gives the child the impression that there is nothing that can be added.

(*b*) *Textbooks based on practical exercises*

At the opposite pole from the first type, there are textbooks which put the main stress on individual or group research. They take the form of 'series of directed observations' and for each lesson they bring together appropriate texts, narratives, photographs and all useful material, together with suggestions for exercises, questions and the comparisons to be worked out. Textbooks of this kind thus give an important place to observation, reflection and judgement. They adopt throughout a basis of concrete facts and offer the pupil interesting, attractive work with considerable scope for initiative. However, they too have their disadvantages: the whole work of synthesis remains to be done and the textbook does not even give a hint of how to go about it. Moreover, if any trace of the synthesis is to be preserved, the chain of reasoning, the results of work carried out and the conclusions must be entered in the student's notebook; this task will become increasingly burdensome as progress through the secondary school continues.

(*c*) *Textbooks combining the two methods*

The third type of textbook incorporates the best features of both the first two. Each chapter is in two parts: the first part approximates to the type (*b*) manual and enables extremely concrete work to be done by the use of the active method; the second part consists of a connected exposition leading up to general conclusions the nature of which follows strictly from the preliminary work. Finally, subjects are suggested for exercises designed to drive home the ideas acquired and even to give them added substance. Thus, the pupil has under his hand what is at once a guide and a compendium of useful references for his personal work. The disadvantage is that textbooks of this kind are voluminous and this frightens many teachers. Any teacher who wishes to make full use of the textbook feels himself bound by it and deprived of any personal initiative.

The conclusion must therefore be drawn that there is no such thing as a perfect textbook. The teacher plays a primordial part. Whatever book he has, it is for him to make his own selection from the material offered. He must use it according to his conception of the lesson and he must supplement it as he thinks necessary.

The choice of textbook, when left to teachers, will be governed by various considerations—suitability for the use in view, adequacy of background material, clarity of style and layout, intellectual honesty, simplicity. Textbooks of types (*b*) and (*c*) seem to be preferable for junior classes while types (*c*) or (*a*) will be better for the upper forms in secondary schools. But in any case, use must be made of the textbook that is available. It must remain 'the humble but enlightened handmaid of teaching'.

Atlases

It is highly desirable that each pupil should have a copy of a school atlas suitable for his level. This atlas is a teaching aid. All the maps in it should be clear and without excessive detail. They should be constructed with due regard to teaching requirements (uniform use of conventional signs, colours, etc.). When the atlases available are connected with a collection of wall-maps, this makes the work appreciably easier for the pupils and they quickly become familiar with the whole range of cartographic conventions.

Specialized atlases are outstanding aids to the teacher himself and can sometimes be used in class. For instance, in France, the *Atlas des formes du relief*, which covers the whole subject of the country's morphology, offers enthralling views of reliefs based on the contour map which the pupils can work at with bi-coloured spectacles.

Thus, by using a good atlas, pupils acquire not only new knowledge but also—and this is so valuable in education—the *habit of individual work*. It is to be regretted that school atlases are still relatively costly and awareness of this problem has led certain publishers, more particularly in the United States, Great Britain and France, to make a special point of issuing reasonably priced atlases some of which sell in thousands and are even found on sale in modern supermarkets.

Terrestrial globes

Everyone knows that the terrestrial globe is the only representation of the earth in which there is no distortion. On that account it should be used frequently, especially with junior classes to make them understand the exaggerations and distortions found in maps. So many of them derive a completely false picture of the shape and dimensions of Canada or Greenland from the way they are represented in a map on Mercator's projection!

As far as possible, a globe should be used to show true forms, proportions and distances. There are various types of globes—made of wood, plaster, plastic or rubber. Some of them have smooth surfaces, while others are moulded to show the reliefs of continents and the depths of oceans. Some globes have a slate surface on which it is possible to draw in chalk. The globe is essential for teaching many other things than shapes and distances. It serves, in the first place, to illustrate the oneness of the world and then to inculcate the rudiments of cosmography, and to teach pupils what meridians and parallels are and why there are differences in the time of day. For these purposes a plain wooden globe, with a slate, plaster or painted surface, will suffice, provided it is mounted on an axis set at the proper angle. Parallels of latitude can be represented when the sphere is revolving by drawing-pins with coloured heads inserted at various points, whilst meridians can be shown by chalk lines or elastic bands. A light plywood or cardboard sheet, in which is cut a hole slightly wider in diameter than the globe used, will serve to indicate the area of illumination in relation to some source of light. The pupils can supplement or confirm the teacher's exposition for themselves with the help of small globes of similar construction, or more simply still by using as a globe a fruit or a ball with a needle for axis. These inexpensive bare spheres are easy for a craftsman to make. However, these specific uses apart, a major defect of terrestrial globes is their small size. The largest are not more than 23·5 or 31·5 inches in diameter.

We must therefore resign ourselves to using wall-maps for more detailed geography studies.

Wall-maps

Each school class should have a collection of wall-maps chosen in the light of the syllabus and for certain essential qualities. A wall-map used for teaching must be comprehensible to all pupils, that is to say, it must be simple and easily read. Hence, the choice will fall in the first place on analytical maps illustrating mainly single aspects of the subject, such as relief maps and climate maps. However, this must not be carried too far, for to use only this one type of map would be to betray the main purpose, namely, the establishment of relationships. In the end, the most useful maps are those of the synthetic types such as those showing the relief and hydrography, which are so closely interdependent that they are never mapped separately. Many sheets include, below the main map, a series of small inset maps of the same area dealing with other aspects of the subject. In such cases instructive relationships can be demonstrated although children at some distance from the map may have difficulty in seeing the insets.

The following points are essential:

(*a*) *Wall-maps must be clear.* Colours should be sharp and outlines clear, though all wall-maps are to some extent diagrammatic. There should be a minimum of printed inscriptions. This does not mean that the map will be empty as the conventional signs fill it sufficiently.

(*b*) *Wall-maps must be accurate.* In this respect it is advisable to take into account the kind of projection used in choosing each map. Thus, Mercator's projection should be avoided for political maps of the cold temperate zones.

(*c*) *Wall-maps must be large.* The average one-square-metre (10·8 sq ft) size is only just acceptable for a classroom 31 feet in length. The attempt to provide maps of maximum size gives rise, however, to a number of practical problems, for the representation of regions of different area on sheets of the same size entails the adoption of different scales and this may mislead pupils when they make mental comparisons.

(*d*) *Wall-maps lend themselves well to teaching devices.* These devices nevertheless involve some loss of fidelity, but a map of waterways, for instance, will convey more if heavier lines are used to draw the canals that are busiest, and larger lettering for the main ports.

(*e*) *Wall-maps must be strong.* Several types are in use—cardboard

(rigid), canvas-mounted (rolled for stowage), folding (linen-backed paper) and ordinary paper (fragile but less costly).

Finally, *blank maps* can be used with advantage for question periods and tests. They should be well drawn and very clear with nothing superimposed on the outline. Such maps compel pupils to make a real effort in regard to names and localization.

Thus there is a wide choice of maps. A full set should include:

World maps showing reliefs, climates, vegetation and population.
Physical and political maps of the various parts of the world showing, if possible, natural, human and economic features.
Maps of the principal countries or at least of those covered by the class's syllabus.
Maps of the country in which the school is situated (general maps and regional maps).

Instruments

There are on sale teaching appliances which are useful and often extremely ingenious but also very costly. Such appliances are beyond the means of most schools. However, with a little ingenuity it is possible to construct simple, rough and sturdy appliances which can be of great use. The following are some examples:

(*a*) *Apparatus for measuring temperature, atmospheric pressure and precipitation*

It should be easy enough to have the use of a thermometer and a barometer. Failing this, schools could collect temperature and air pressure data in various spots from the newspapers or the radio. The improvisation of a rain gauge presents no difficulties. All that is needed is a funnel inserted in a measuring beaker graduated in accordance with the ratio of the 'catchment' area of the funnel to the area of the cross-section of the beaker. This gives the depth of water as a direct reading. Falls of snow are measured with a snowtable—a square wooden table, 1 ft by 1 ft, set up in a place sheltered from the wind and fitted with an iron spike long enough to mark the position of the snowtable under the snow. The depth of the snow is measured with a graduated ruler after each fall. For measuring the total depth of snow, the graduated snow scale which is used is fixed permanently in the ground.[1]

1. G. Oscar Villeneuve: *Manuel de l'observateur en météorologie*, Québec Service météorologique provincial, Bull. no. 12, 1949, pp. 20–8.

All these observations will provide a good foundation for the study of climatology.

(*b*) *Other measuring instruments*

It is not much more difficult for pupils to procure a few simple instruments such as a magnetic compass, elementary mapping and

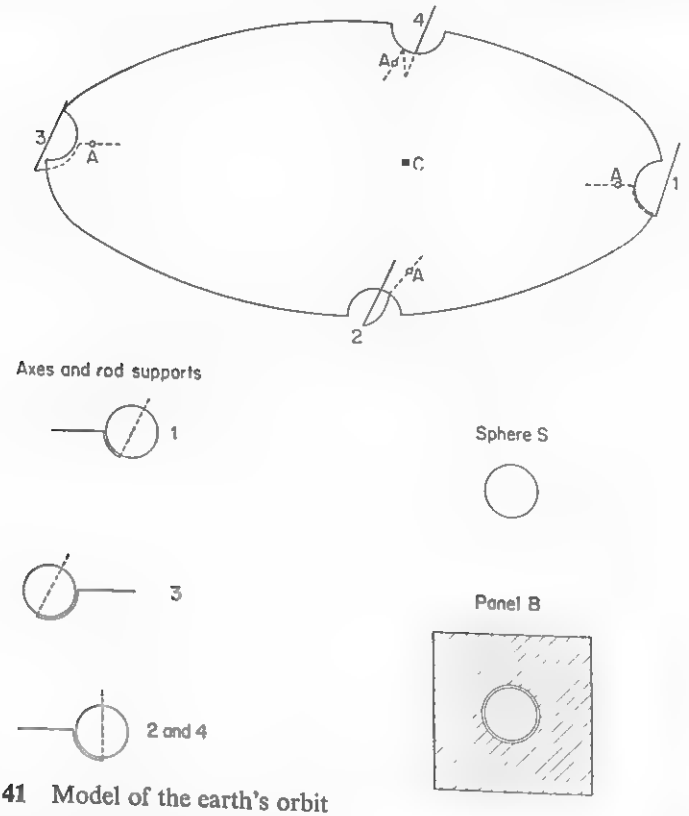


Fig. 41 Model of the earth's orbit

drawing material (pencils, rulers, compass, etc.), the use of which is shown them by their teachers during field work.

(*c*) *Model of the earth's orbit*

This appliance is for demonstrations in the lessons concerned with the orbital movement of the earth around the sun, which it is difficult for pupils to visualize, whatever their age. A 'home-made' appliance as illustrated in Fig. 41 can be produced by the teacher or by a craftsman, or sometimes in the workshop of a technical college. It is of the utmost help and is comparatively inexpensive. This is how it is made:

An ellipse is shaped from a panel, say, of plywood, the outer edge representing the path followed by the earth's centre. The ellipse is exaggerated to allow for the angle of vision of a seated class. Semi-circles are cut out of the edge of the ellipse at points 1, 2, 3 and 4 on the drawing, representing the solstices and equinoxes, their diameter being a little larger than that of the sphere S. At the positions marked A in Fig. 41 four steel rods, previously bent to the correct angles in a forge, are bolted to the plywood panel to represent the earth's polar axis, at the solstices and equinoxes. The small wooden sphere S is the work of a wood turner, and is drilled through the centre so that it can be slid on to each of the fixed rods. A circle of the same diameter as the sphere S is cut from a second panel B and this will mark the limit of illumination if the appliance is being used in a lighted classroom. In a darkened room, it is only necessary to place some source of light at the point marked C on the drawing.

With the help of this appliance, with which nothing can go wrong, teachers will find that their lessons are better understood by their pupils.

(*d*) *The sand-tray*

For the young primary school pupils, psychologists recommend the use of this appliance at a very early stage, since the ease with which sand can be handled makes it possible to combine the advantages of sketches with those of relief models. The sand-tray is used mainly to introduce to the children ground-plans, elementary cartography, and the forms of land-relief, both those they can see around them and those they cannot observe but can study in maps or photographs. In addition, if a bed of clay is laid under the sand the sand-tray can be tilted and it then becomes possible to carry out certain experiments to illustrate the phenomena of gullying, run-off and water infiltration.

The construction of a sand-tray presents no difficulty. All that is needed is a supply of fine, clean sand procured either from a beach or from a builder's yard, and a box or boxes to put it in. The pupils will gather round these boxes to work as directed by the teacher, and it is important that he should begin by making them study the map they are going to model and should then determine the horizontal and vertical scales. They are then ready to begin methodical modelling, the first step being to moisten the sand sufficiently for it to keep in shape. The sand is dug away from the river system and heaped up for the relief, with suitable symbols to show the positions of towns and fields, and coloured tapes are used to represent communication routes. This is a kind of group work which makes geography popular with children.

(*e*) *Models* (see previous chapter)

Models in sand crumble away and collapse as soon as the sand dries out, which is why other materials are sometimes preferred for the production of models which will last. These models should be preserved and teachers can gradually build up collections of them by varying the exercises each year.

Of course excellent models are obtainable from commercial sources, but if they cannot be bought, the teacher must rely on his class making them under his supervision, whilst bearing in mind always the fact that it is extremely difficult to achieve complete accuracy. He should therefore set the children to making general prototype models rather than scale models based on a map. Professor O. Tulippe recommends the following:[1]

1. *Models showing the stages in the evolution of the relief* (young mountains, old mountains, volcanic reliefs, etc.).
2. *Models illustrating the geographical terms used to describe land formations* (hills, mountains, passes, plateaux, valleys, etc.).
3. *Models of the geomorphological types* (Jurassian, Appalachian, Cuestas, rejuvenated peneplain, residual hills, glaciers and glacier reliefs).
4. *Models of typical coastal and marine geographical features* (flat coasts, indented rocky coasts, cliffs, capes, isthmuses, bays, gulfs, lagoons, ports and canals).

The choice as between clay and plaster for models will depend on what materials the locality can supply. Clay offers no difficulty as it is easily worked and, being slow drying, there is plenty of time to shape it as desired either to a scale calculated from the map or by a rough approximation; the finished model is heat-dried. Plaster is more delicate to handle. A slow-drying type must be selected, but even so, the modeller needs a precise idea of the desired shapes and sizes before starting the work. He prepares his plaster in small quantities. He then roughs out his model as fast as he can and finishes it off with a knife. That is the way to deal with the parts already set, and more plaster can always be added if and when necessary. All that is needed is first to moisten the surface where the addition is to be made and adhesion will be perfect. Once the model has set completely, it is finished off with sandpaper and water colours.

If rather more money is available better materials can be purchased such as modelling clay, special plasters or Plasticine; but these are not essential for making good schoolroom models.

1. Omer Tulippe: *Méthodologie de la géographie*, Liège, Sciences et Lettres, 1954, p. 114.

Specimen collections

This matter has already been discussed with special reference to the contributions the pupils themselves can make. Their enthusiastic co-operation can always be secured for the asking and each of them will make it a point of honour to find something and bring it to school. For instance, it will never be necessary to buy the simple tools required for modelling (knives, spoons) because each pupil will supply his own. With such help teachers will be able gradually to build up good teaching collections. These include the following:

(*a*) *Rock and mineral specimens*

The geography teacher, without transforming himself into a geologist, will frequently need to touch on the question of rocks and their behaviour. This means that the class must have studied specimens, some from the teacher's own collection, and some collected by themselves in the course of their walks or secured by exchange with other schools in the country or even abroad. It would be a mistake to laugh at these modest efforts. Even a small number of specimens is enough to give a correct idea. The pupil who has looked for, found and studied a piece of healthy granite will quickly understand the respects in which it differs from a decayed granite.

(*b*) *Collection of sketches prepared in advance*

This is a collection to be made by the teacher himself. Whilst it is certainly a long-term task, pursued over a period of years, it is tremendously worth while and is even essential when it is known that for a long time very little money will be available for purchases. The only material required consists of:

large sheets of black drawing paper;
strips of wood to which the sheets will be fixed;
coloured chalks;
a spray.

On the sheets the teacher, carefully and at leisure, draws maps, miscellaneous sketches, diagrams, cross-sections, profiles, graphs, etc. When the drawing is finished, the chalk must be 'fixed' so that it will not rub off. To do this all that is needed is to spray it with any fixative; ordinary beer does excellently.

The present writer was the pupil of a teacher who, during the twenty years of his career, had by these means built up a collection of some hundreds of drawings and even the oldest of them remained perfectly

usable. This kind of equipment can therefore be recommended, for when everything else is lacking, through such drawing many inadequacies in equipment can be overcome. Another advantage is that when rolled up the sheets take little room and present no serious storage problems.

(*c*) *Collections of pictures*

In the twentieth century, pictures have become the best aid to geography teaching since they help to give the subject a concrete character in those cases where direct observation is impossible (see Chapter 4). A collection of photographs, engravings and reproductions should, therefore, be built up. It will consist primarily of the teacher's own material and whatever the school authorities permit him to acquire, but the pupils themselves can make an effective contribution. Further, photography is steadily improving today and teachers and pupils alike should be encouraged to practise this art.

As the material assembled will be of very uneven value, it will be for the teacher to choose what is useful for his class. The rule to be followed is that a picture is good from the geographical point of view only if it can be made to illustrate what the geographer Max Sorre calls the 'substance of the lesson'. Hence, the need is for pictures which are—

1. *instructive*, with sharp images of characteristic subjects;
2. *clear*, illustrating single subjects like Figs. 24 and 34;
3. *typical* of the country or phenomenon being studied (sensational photographs and exceptional subjects should be rejected);
4. *recent*, at least for lessons on economic and human geography.

Photographs answering to these requirements can be found in periodicals, newspapers and books and even after rigorous sifting there will always remain specimens that can be used. To build a sound lesson round photographs the numbers used need not be large. It is indeed the abuse of pictures, a sort of visual overfeeding, that would be harmful.

As the collection will grow larger year by year, it is important to classify the pictures and store them so that they are protected from damage and are easy to find when required for study. The ideal solution is to keep them in closed cabinets, in files or drawers, or, failing this, in strong envelopes (see Chapter 6). A disadvantage of this kind of collection is that most of the pictures are of small size and hence can only be used in class with the aid of a projector, which, unfortunately, cannot yet be classed as one of the items of minimum

equipment. However, the lack of a projector is certainly not a sufficient reason for going without pictures. They are essential whatever the circumstances.

(*d*) *Other collections*

It is sometimes helpful for the teacher to build up, with the aid of his pupils, collections of agricultural products and articles made by craftsmen, from his own country and from abroad, so that pupils will become more familiar with these objects and will even be able to use them as subjects for their written work during periods of supervised activities.

Conclusion in regard to minimum equipment

From what has been said above, the minimum equipment seems already to be fairly extensive. However, of all the working instruments so far described, none is very costly. The teacher's ingenuity, stimulated by his desire to teach geography properly, will enable him to take the best advantage of local circumstances, improvise appliances and ways of using them, and secure the co-operation of his pupils. It is otherwise when we come to the optimum equipment, the acquisition of which depends on the funds available. Some of the items are expensive to buy and give rise to operating expenses (electric current) or hiring charges (slides or films). As a result, the list given in the pages which follow will seem to many over ambitious, but the realization of it nevertheless remains an ideal which every teacher should seek to attain, if only by stages.

Optimum equipment

If a choice had to be made of the appliance which can be used continually and which offers the widest range of possibilities, that choice would have to be the opaque projector. We can begin with a description of what it is and what it does.

The opaque projector

With this appliance it is possible to project the image of a photographic print on paper, a page in an open book, a press cutting or drawing, or an opaque body such as a rock. At a moment's notice, in a question period, a practical period or a lesson, the teacher can

show single specimens, otherwise unusable, to the whole class and in enlargement. In a word, if an opaque projector is available, it is possible, if necessary, to dispense with all other projectors and also with collections of slides.

A good projector will have the following features:

1. *Luminosity*. The lamp should be of at least 700 watts power;
2. *Good cooling arrangements*, without which the glass specimen plate and the exhibit would become too hot;
3. *Adequate size of specimen plate*, say 12 in × 8 in (30 × 20 cm);
4. *A movable lens*, so that every part of the largest photographs can be screened.

Most projectors work best in a darkened room but there are types, with 'opticarex' treated lenses, which can be used in a room that is

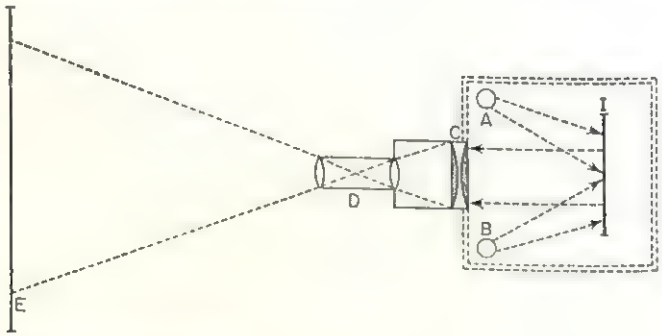


Fig. 42 Model of the episcope

merely dimmed. Teachers who like 'do it yourself' methods or who can secure the help of a scientist colleague can make for themselves a simplified apparatus which will give quite satisfactory results at little cost. The principle of the projector is simple. All that is needed is to direct a beam of light obliquely on to an exhibit which reflects the light received. The deflected beam is picked up by a lens which projects the restored and enlarged image on to the screen.[1]

Figure 42 shows the components of the opaque projector viewed in plan. The picture is at I; at A and B are two lamps of not less than 350 watts each; C is the condenser which concentrates the light reflected by the picture (two convex lenses held together by lateral steel plates); D is the adjustable lens for focusing the image on the screen; and E is the screen.

1. The details for making the opaque projector are taken from the periodical *L'Educateur*, Editions de l'école moderne française, ALTGINA, Cannes (A.M.), France.

The condenser lenses need to be fairly large, like those of a magic lantern; they should have a frontal diameter of not less than 4 in (10 cm). A focal distance of at least 6 in (15 cm) is essential; the best results are secured when this distance is 15–20 in (40–50 cm). The single dotted lines indicate the trajectory of the light rays. From the lamps at A and B they fall on the picture (I) after being deflected by the mirror (M in Fig. 43), whence they pass to the condenser (C) and finally the lens (D) projects them on to the screen.

Figure 43 shows the opaque projector in vertical section and makes the arrangement of the parts clearer. To use the apparatus, the picture to be projected is placed face downwards on a plate of thick glass which protects it against the danger of heating up. The picture is kept in place by a sheet of cardboard or a piece of metal plate. The mirror (M) is tilted at 45° to the picture. The half-surfaces of the lamps

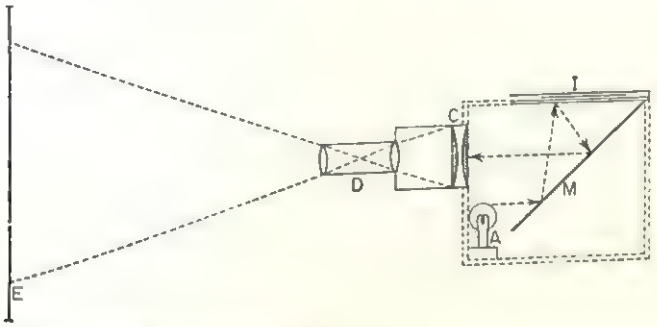


Fig. 43 The episcope in cross-section

(A and B) away from the mirror are silvered to avoid losses of light intensity. The parts are assembled in a box whose sides are shown in double dotted lines on each figure (42 and 43). To reduce heating, it is advisable to make this box fairly large and to fit it with a fan (not shown in the diagrams) directing a stream of air both on to the lamps and on to the picture. The dimensions of the appliance vary according to the parts available to the constructor and he will determine them either by calculation or, more simply, by using his own judgement.

The plans for this home-made opaque projector were devised by teachers who had no funds for the purchase of apparatus of this kind. They say that it gives very satisfactory results. The picture is correctly projected on to the screen and enlargement is considerable. For instance, for an exhibit measuring 3·5 in × 5 in (9 × 12 cm) projected from a distance of 6·5 ft (2 m), the image is enlarged to 5 ft × 6·5 ft (1·5 × 2 m). Encouraged by their success, these teachers

have since built a cartoscope on the same principle with which documents with dimensions of up to 8·3 in × 10·6 in (21 × 27 cm) can be projected.

Projectors

Apart from pictures on paper, increasing use is being made of a variety of visual aids.

(*a*) *Filmstrips*

The numerous filmstrip series are available in two forms:

1. Flat bands each with a dozen pictures which can be stored in folders.

2. Reels of film with numerous pictures which can be stored in the classroom in small boxes in pigeon-holes. These strips are generally on 35-mm film and can be either black and white or coloured (some users prefer the latter provided the colour is good, but coloured films are more expensive). Filmstrip has many advantages, each series being designed for a particular lesson and produced by a specialist. These films are sold with leaflets describing the pictures and giving essential details. All this facilitates the teacher's work in preparing lessons. He should not, however, feel that his own hands are tied. In particular, when the information supplied with the film is too copious, the teacher is free to select what is suitable for illustrating his lesson. However, there are disadvantages—first and foremost the relatively high cost. This objection, however, is steadily losing force as technical advances make it possible to reduce prices considerably both for accessories and for apparatus. On the other hand, the cumulative cost of filmstrip, as also of ordinary slides, can mount up to fairly considerable sums when a large collection is formed. Another difficulty is that projection is normally satisfactory only in a darkened classroom and this creates problems in regions which have a very hot and humid climate, where moreover the projects deteriorate very quickly.[1] Today there are remedies for this: the rooms can be air-conditioned; and again some manufacturers have developed 'tropical' projectors, which are extremely hard-wearing and many of which can be used quite satisfactorily in daylight, particularly if special 'daylight' screens are used.

1. A teacher in Thailand tells us that in his country it is impossible to black out a classroom completely as there is a danger of the pupils falling asleep or fainting from the heat and lack of air.

(*b*) *Slides*

These now take the form of positive photographic transparencies mounted in a 2 in × 2 in (50 × 50 mm) frame, either a mere cardboard surround (the commonest type) or between two strips of glass, which protects the film better. Slides, like filmstrip, are made both in black and white and in colour. However, they have appreciable advantages over filmstrip and serve many purposes. The teacher chooses the ones he wants when he is preparing his lesson and shows them at the appropriate moment (see Chapters 4 and 6). The same slide can be put to good use for the purposes of several different lessons.

Nowadays, there are many cameras designed to take photographs which can be printed direct on slides of this kind so that teachers and pupils can themselves add to the collection used in class. Some slides which are obtainable commercially, particularly in places visited by tourists, are worthy of inclusion in class collections provided a judicious choice is made. Projectors have been improved to the point of being entirely automatic and even remote-controlled. Another way of making slides at low cost is to cut out interesting shots from filmstrip no longer in use and mount them in cardboard of the required dimensions.

The modern projector has not entirely ousted the old-fashioned projection lantern. With interchangeable slide holders, the lanterns have the advantage of taking transparencies on glass of any size from 2 in × 2 in (50 × 50 mm) up to 4 in × 6 in (100 × 150 mm) and give excellent images on the screen without risk of excessive heating. The 'universal' slide lantern also opens up a new possibility for teachers. If they can procure some sheets of plain glass of suitable size, teachers can draw any figures they want in Indian ink for projection like an ordinary transparency. The slides can be washed in water and used again indefinitely.

Lastly, there are other projectors for transparent objects of sizes up to 10 in × 10 in (250 × 250 mm), in particular all translucid documents, slides, positive drawings and even original drawings on transparent paper. The appliance stands on the horizontal plane in front of the teacher, and projects the image behind him either over his head or to one side of him. He can even make drawings in the course of his lesson and use this apparatus to project sketches as they are made. It is generally called the overhead projector.

(*c*) *Stereoscopic pictures*

It is a pity that stereoscopes are not in wide use as they have the great advantage of showing images in apparent relief. It is reported,

however, that they are regaining popularity in American schools and some pupils prefer stereoscopic pictures to television. The best results are secured by using 'anaglyph' photographs or postcards where the only effect is given by viewing through two-colour spectacles (red and green). The images are projected by a good opaque projector and the pupils, provided with viewing spectacles, must be fairly near the screen and directly in front of it.

(*d*) *'Backwoods' appliances*

Some manufacturers have developed projectors with which slides and filmstrips can be shown even in countries where there is not yet any electricity supply. These appliances can be used with a car battery or an accumulator, or even with a gasoline lamp.

(*e*) *Usefulness of projectors*

It is highly desirable that all schools should have some type of projector, as these appliances render most valuable service. At the same time, it must be possible to acquire collections of films or slides and add to them continually, and this implies operating expenses. It is for this reason that many countries have established official supply services for the benefit of schools, which offer advantageous terms for the purchase or hire of appliances and accessories.

When there are several geography teachers on the staff, it is recommended that a school should possess several types of appliance so as to provide the widest range of possible uses. On the other hand, if there is only one geography teacher in a school, he should give preference to a multi-purpose appliance such as an epidiascope fitted with a film-gate. He will then be able to use all projection methods. However, for each different method, he will have to adjust his light source, and this is a disadvantage, in particular with regard to opaque projection. Modern technology has developed various improvements which can facilitate the teacher's work: a luminous arrow instead of the old lecturer's pointer; an automatic slide-changer which does away with hand changing of slides; remote control, etc. However, none of these costly refinements is essential.

Duplicators

As will be pointed out in the next chapter, every school should have a duplicating machine so that the teacher can distribute a copy of any document to every pupil. Many types of duplicator are available commercially; but of course it is not enough merely to acquire

the duplicator; there are also the stencils which have to be cut on the typewriter or with a stylus where drawings have to be copied. In the absence of a commercial duplicator, the ingenious teacher uses a lithographic stone or hectograph paste; both are inexpensive, easy to use and give satisfactory results, better than those formerly obtained with gelatine. The only supplies needed are paper and a special greasy ink. The procedure is as follows: the teacher draws the diagram or writes out the text to be reproduced and applies the first sheet for a short time to the paste which is contained in flat, metal holders that can be of various sizes. He then removes his original and applies a blank sheet which takes the impression in a short time. With a suitable paste, enough good copies can be obtained for the whole class. This economical procedure is to be recommended particularly when the pupils have no copies of certain texts or narratives, certain complex sketches which they would find it extremely difficult to draw or copy, or certain maps or map bases, etc.

The cinematograph

To speak of the cinema is to evoke the powerful attraction it has nowadays for children and adults alike. Advice on the use of films in class will be found in Chapter 4. For the present it must suffice merely to try to indicate why a motion picture projector has a place in school equipment. For illustrating a whole range of phenomena such as volcanic eruptions, avalanches, the impact of waves on shores and cliffs, or man's work in town and country, there is no substitute for motion pictures. Again, there are facts which will be better understood when shown speeded up or in slow motion or in animated drawings.

Although the motion picture industry's output does not always meet the needs of teaching, there are three kinds of film which can be shown in class:

(*a*) *Informative films*, whose purpose is to show pupils things that are new to them.
(*b*) *Emotive films*, which appeal to their feelings and sympathies.
(*c*) *Educational films*, which are real study aids.

These films are available in various widths—35 mm, 16 mm or 8 mm—and can be bought or hired (see addresses of distributors in Chapter 8). They are normally 'shorts', running from ten to twenty minutes. There are certain difficulties connected with their use. Not only must the teacher have prepared his lesson carefully to fit the film but he must be in a position to—

(i) correct the transient character which is the basic defect of motion pictures and he must accordingly stop the film at some particular picture or pictures;

(ii) direct his pupils' attention and help them to understand by announcing the important sequences. Many teachers prefer silent films to sound films, although it is possible to tune the sound down or even to turn it off altogether;

(iii) run the film through again in order to consolidate the ideas absorbed by his pupils.

Documentary films, admirable in conception but designed for large audiences, are not entirely suitable for school use. They are often too long for normal teaching purposes; to purchase them is out of the question; and even the cost of hiring them is often prohibitive where there is no official school supply agency or co-operative.

Another problem that arises is that of installing the film projector. The room fitted out for ordinary slide projectors which operate in the dark is quite suitable for film-showing if, where sound films are used, the acoustics are correct. Contrary to what one might think, the purchase price of the equipment is often lower, quality for quality, than that of an opaque projector. There are, moreover, modest hand-operated projectors which can be stopped at will. They run quite silently and can be speeded up or slowed down as desired. In a word, it is clear that the cinematograph is not generally used to the full extent of its vast possibilities. For this to occur there would have to be powerful national organizations in every country not only to facilitate the acquisition of the equipment but also to organize the making of genuine educational films.

Television

The latest-born of the teaching aids, television, offers two sorts of broadcast of which advantage can be taken for school purposes:

(*a*) There are items of the ordinary programmes that have a geographical interest (e.g. talks on various countries, accounts of exploration, journeys, etc.). However, most of these broadcasts take place outside school hours and thus they serve only as sources of information and general knowledge. They may incite the viewer to make a more thorough study of some question or to purchase a particular book, but cannot be of direct use in school.

(*b*) There are broadcasts especially for schools. These are of the greatest value as they are planned and produced by specialists intimately acquainted with teaching problems. For each class they provide

the best material in the form of brief and well-selected sequences with the necessary comments to accompany the actual showing of the film.

Immediately after the broadcast the teacher can go straight on to check whether it has 'penetrated' or to amplify particular explanations, and will get excellent results provided he clearly realizes that television is an auxiliary and not a substitute that gives the lesson in his stead. The necessary practical arrangements are simple. A large screen is needed so that all the class can see well without their attention being distracted by too great a change in the normal classroom arrangements, and they must be able to take notes as in an ordinary lesson unless they can be given a summary or even the full text of the televised lesson.

All over the world great efforts are at present being made to bring school television into being and these receive the full backing of the international agencies, particularly in those countries where teaching material and staff are lacking. Some closed-circuit programmes offer the greatest promise. Geography ought to be one of the first subjects to benefit from these new techniques, for television does not merely rely on the traditional teaching aids, such as films and slides, but shows classes real scenes shot 'live', such as tours of a town, a port, a factory or a farm, and aerial views of typical country in different parts of the world. This is particularly true of various remarkable cinerama documentaries.

Other miscellaneous appliances

(*a*) *Radio*

In teaching geography radio can be used only to a limited extent since the subject is one ill-adapted to assimilation by ear only. However, pupils and teachers alike will listen with interest to talks by travellers and explorers, to discussions by experts on geographical problems, such as the depopulation of the countryside, recent earth tremors or even simply the weather forecasts. Nevertheless, even if these broadcasts take place during school hours, their educational value is very uncertain. No stops are possible; the teacher cannot 'prepare' the lesson; and often—except in the case of the programmes for schools—the date of the broadcast does not fit in with that of the lesson.

(*b*) *Tape-recorder*

What has just been said shows the advantage of having a tape-recorder. Tape-recorders are extremely easy to handle and make it

possible for any broadcast programme to be recorded. This means that the teacher can preserve and collect items, study them at leisure and reduce them to what he can make use of. It is easy to edit the tape. He can then use this material at the appropriate points in his lesson. As portable tape-recorders are now available, the 'live' recording of material is also extremely easy. Thus, the range of uses of tape-recorders is considerable and a good model costs barely double the price of a wireless set.

(*c*) *Gramophone records and recording of vision and sound on tape*

Nowadays the attractions of the record player and of records are much reduced. While serving exactly the same purposes, they offer less varied scope than the appliances mentioned above, as only commercial records can be employed.[1] On the other hand, a recent invention offers amazing possibilities to the geography teacher. This is the recording of sound and vision together on tape (e.g. by the Ampex method, just developed). For the time being this technique is used only in television studios, but, like all other inventions, it will in due course be brought within the reach of everyone. It is easy to foresee what a magnificent new auxiliary the teacher will then have at his disposal.

Map collections

(*a*) *Large-scale maps*

These are maps to scales of from 1 : 1,000 to 1 : 200,000 (see Chapter 4). Generally speaking, these maps are extremely well produced and combine clarity with complete detail. Work with them produces excellent results. Juniors aged from 8 to 11, given the necessary explanations, will quickly learn to read a 1 : 1,000 or 1 : 2,500 town plan. They will prove perfectly capable of identifying from the mass of detail represented the features they have actually seen on the ground. This they will do much better than on a map in an atlas or textbook, which is more general and hence, as far as they are concerned, more abstract. They will soon learn to make accurate measurements and calculations. The number of exercises that can be done is considerable. Thus large-scale maps provide an exceptionally good introduction to the comprehension of the facts of geography and to the use of techniques which the pupil will employ throughout his school life.

1. There are, however, some new disc recordings of considerable educational value, e.g. those providing background noises for the pictures being projected, such as the everyday noises of a town, a factory, a shipyard or a country scene.

Later on, according to the syllabus, the scales of the maps the pupil will work on will be chosen to suit the subject. Thus a 1 : 50,000 map is perfectly suitable for studying rural habitats, but 1 : 200,000 is preferable for studying general reliefs such as a system of escarpments. One map sheet will be needed for each team of two or three pupils and there must be storage facilities (Chapter 6) and perfectly level tables large enough to avoid all risk of damage.

(*b*) *Blank maps and large-scale outline maps*

As pointed out earlier, blank maps are immensely useful in teaching. They can be bought with other school supplies, but teachers can make their own relatively cheaply. The simplest way is to use the school's duplicating machine, but then only small blank maps will be produced. To make larger outline maps they must be drawn on a transparent sheet, and then reproduced like architects' and engineers' drawings in specialist workshops. An American geographer gives a fairly simple method for producing coloured wall-maps in large numbers of copies.[1]

(*c*) *Maps and models in relief* (see Chapter 4, p. 130)

Relief maps are excellent aids in observation work if they are large-scale regional maps, accurate, clear and pleasant to look at and hence easy to read and interpret. They help the pupil enormously in acquiring familiarity with the conventions of plane maps.

Relief models are on sale commercially, but given the necessary time and materials, it is possible for the teacher to make them for himself with the help of his class. There are various methods which can be used, but the one which can be most recommended is that in which thin sheets of cardboard or other material are used.

The first step is to choose from a topographic map the type of relief that it is desired to represent—e.g. as in Fig. 44, a hill rising from an altitude of 180 metres to 260 metres. The base of the model is formed by a substantial square of wood or plywood. The cardboard sheets are then cut to the shape of the successive contours, one sheet being needed for each contour shown, i.e. four in the present instance. The thickness of the sheets will represent the interval between the contours, to conform to the vertical scale adopted; in the present instance the thickness or vertical scale represents a 20-metre interval. On the first cardboard sheet (drawing no. 1 on Fig. 44) the lowest contour line—200 metres—is traced, then cut out and stuck on to the

1. Randall D. Sale: 'A technique for producing colored wall maps', *The Professional Geographer*, vol. XIII, no. 2, March 1961, pp. 19–21.

base-board. The process is repeated with the second sheet for the 220-metre contour, and similarly for the third at 240 metres and the last at 260. The finished work now looks like drawing no. 2 in Fig. 44,

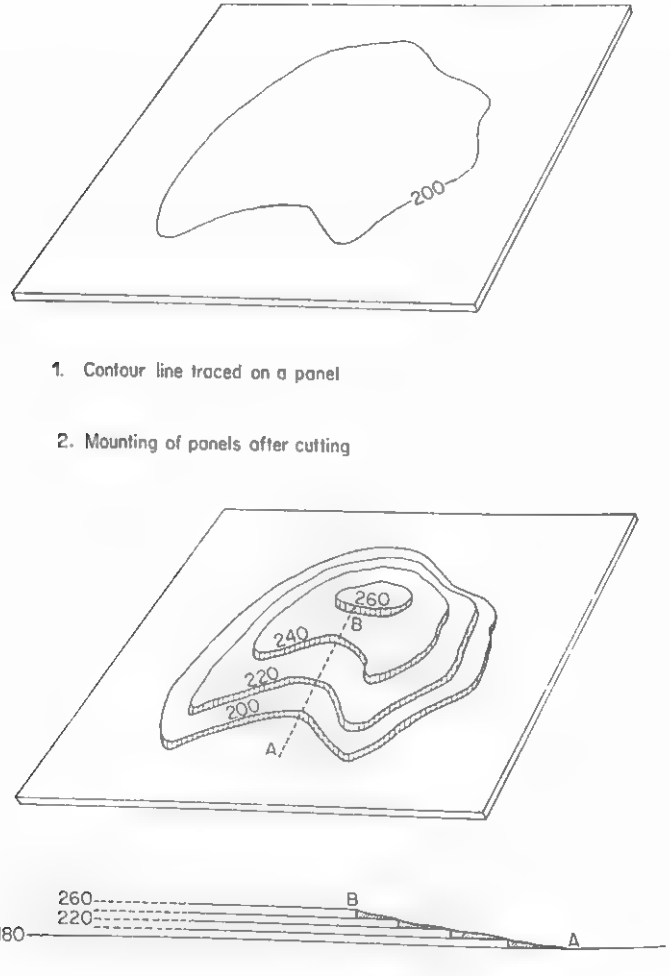


Fig. 44 Construction of a relief model

with the relief in the improbable form of a series of steps. To give the 'skeleton' relief the appearance it actually has on the topographical map that was selected for representation, the 'treads' on them are filled in with modelling clay, giving a regular profile as shown in drawing no. 3 of Fig. 44 (profile AB). If the modeller is anything of an artist he

will then touch up the relief model and paint in the hydrographic system, vegetation, localities and communications.

The geography library

Whether it is located in the geography room (Chapter 6) or in the classroom or elsewhere in the school, a library—and sometimes a map collection—is justified on two grounds: first, it is a source of reference material which helps the pupil and facilitates his work, and secondly, it enables teachers and pupils alike to add to their knowledge and satisfy their intellectual curiosity. In short, it is an instrument of culture which supplements the material equipment described earlier.

To the extent that the funds available to the school permit, the teacher will try to procure for the library:

(*a*) *General reference works*

Miscellaneous atlases, standard works, geography textbooks other than those officially prescribed for pupils, encyclopaedias, geographical reviews, national and international yearbooks and statistical bulletins (these statistics are sometimes transferred to cards for easier use).

(*b*) *Individual reading*

Travel books, books by explorers, popular geographical reviews, literary works of acknowledged geographical accuracy.

(*c*) *A class card index*

This was strongly recommended by those attending the seminar organized by Unesco in Montreal in 1950. The following in particular should be included:

1. Cards on the main raw materials of the world and on the principal manufactured products indicating in each case total output, where produced, and trade currents.
2. Cards on individual countries giving in each case area, population, resources, frontiers, etc.

It is the teacher's business to prepare such cards and to put them at his pupils' disposal. The latter, however, can help him greatly. The card index could be expanded to include veritable files of reference material assembled by the pupils and added to year by year. The file for a particular country or region, for instance, would include all the

relevant texts it has been possible to collect regarding the geography of the country or region concerned. The teacher would only intervene to advise his pupils and help them to sift and classify their material. Schoolchildren take a great interest in this kind of creative and individual work and are perfectly ready to give up some of their spare time to it. The teacher also benefits since some of the information contributed by his pupils may be unknown to him. This kind of exercise can be introduced in all classes, with due adjustment for circumstances and for the age of the pupils.

To conclude these remarks on the geography library, it is to be hoped that the education authorities of every country in the world, if they have not already done so, will start information services for teachers and pupils.

What does emerge from the present chapter is that modern geography can draw on a considerable range of teaching aids. To expect to have them all would be utopian and we must avoid becoming obsessed with equipment; however, the very number of the aids that can be acquired is a safeguard. If some of them are available, teaching improves. If still more become available, geography work will produce progressively better results.

6 The geography room

GEOGRAPHY IS the bridge between the humanities and the sciences and the tools of the geographer are nearly as manifold and varied as those required by the scientist. Therefore a special room or laboratory is as necessary for the geographer as for the scientist. The geography teacher will need to use wall-maps, globes, epidiascopes and other paraphernalia attendant upon his trade, and it is not easy for him to carry them from classroom to classroom. Moreover in a geography lesson the pupils should not be sitting passively at a desk, even if it is of an adequate size to take the variety of books and atlases required. Provisions should also be made for the drawing and construction of maps, plans and diagrams, for model making, for observation of the heavenly bodies, and for a close study of geological, botanical and economic specimens. Geography learning will therefore involve a good deal of movement around the teaching space, with the need to work with maps, to consult reference books, to scrutinize a big atlas, and to study large-scale maps, pictures and newspaper articles. It will also be necessary to have facilities for the immediate darkening of the room in order to study lantern slides or films or to display to the whole class a picture from a reference book.

From the above it will be clear that whatever may be the shortage of building space, geography should be given equal consideration with the sciences in the provision of a separate room. Ideally this should be larger than the average classroom but if the worst comes to the worst an ordinary classroom can be successfully converted. It is not unusual for teachers to remain in their own rooms and for their pupils to move to them at the end of each lesson; therefore it is not impossible for the geography teacher's room to be so modified as to make an adequate geography room or laboratory. Where a new building is being considered, however, or where space is available, the advantages of a separate room cannot be too strongly stressed; whether it is called the geography room or the geography laboratory is of little importance.

In considering the size and layout of a room suitable for the purpose of efficient geography teaching the space can be divided into four distinct areas: class seated area, teaching area, class working area and storage space.

Class-seated area

At any given moment each pupil may need to have in front of him an atlas, a notebook and one or two medium-sized reference books. In addition to these, but not necessarily at the same time, he will be required to study and work on a large-scale map sheet which, in Great Britain for example, measures 2 ft 11 in × 2 ft 5 in (89 cm × 73·5 cm). Ideally therefore each pupil should have a table top three feet (91·5 cm) square with three feet (91·5 cm) clear space all around in order to have adequate working room from each side of the table; i.e. 36 sq ft (3·35 sq m) in all. With a class of 30 pupils this would mean an area of 30 × 36 sq ft, i.e. 1,080 sq ft (100·5 sq m). Few schools, however, could afford such a set-up and considerable reductions can be effected without much reduction in efficiency. In the first place it is not disadvantageous and often useful to have two pupils sitting adjacent, as much practical work will involve working in pairs and the value of mutual co-operation is emphasized. By effecting a compromise on the working space available for each pupil therefore, it has been found satisfactory to allot as a minimum requirement for each pair of pupils a table 4 ft × 2½ ft (122 × 76 cm). The table should be flat, without channel for pencil and pens; no ink wells should be fitted. It is debatable whether the tables should be of standard height with chairs for comfort, or whether they should be of laboratory height (3 ft; 91·5 cm) with stools so that work can be done on maps by pupils standing or seated. The room is a dual-purpose room and while the former arrangement offers greater comfort for normal class work the latter is more suitable for practical map work. On the whole it is probably better to sacrifice comfort for general practicability, an additional advantage of the higher tables being that the stools can be pushed underneath them when pupils wish to move round during practical work. It is also advantageous if the tables are provided with ledges or drawers for the pupils' spare books, but these should not impede the sliding of stools underneath.

The arrangement of the tables will depend upon the shape of the room, the number of pupils in the class and the size of the class-seated area available. By arranging five rows of six pupils at double tables measuring 4½ ft × 2½ ft (137 cm × 76 cm) with 2 ft (61 cm) space all around and 2½ ft (76 cm) gangways at the side, an area of 517 sq ft (48 sq m) is taken up, which will allow plenty of working space at each table and plenty of space in the side gangways for pupils to study pictures on the walls. On the other hand if such a liberal allocation is not possible all the gangways can be cut down to 1½ ft (45·75 cm),

and the working space thus reduced to 422 sq ft (39·25 sq m). Similarly four rows of eight pupils with only centre and side gangways of 2 ft (61 cm) will take up 432 sq ft (40·2 sq m) or 360 sq ft (33·5 sq m) if the gangways are reduced to $1\frac{1}{2}$ ft (45·75 cm), a class-seated space which should be considered a minimum.

If the tables are too small to take a complete large-scale map sheet, it is advisable to have them slotted on the furthest side from the pupil. The part of the map which overhangs the table can then be slipped into the slot, and is thus less likely to get crumpled. Slots can easily be made by screwing on to an existing table a thin strip of wood, separated from the table by distance pieces of about one inch (2·5 cm) in length.

Teaching area

The main but not the only teaching space will be in front of the class. At least 10 ft (3 m) should be allowed between the front row of tables and the wall behind the teacher, otherwise pupils sitting at the sides will not have a proper view of the chalkboard, wall-maps or projection screens. The teacher's main requirement is for adequate chalkboard space, for in geography more than in any other subject there is a need to conserve diagrams and maps for subsequent use. There are few more time-wasting or energy-consuming tasks than to be compelled to draw the same map or diagram three or four times during a week for different classes or even the same one. In some schools, therefore, the chalkboard covers the whole of the front wall. It should be provided with writing surface on both sides; such a board is well worth the cost. There are four other methods of obtaining large areas of board which take up little space: 1. The roller board; this gives the largest total area for the smallest space taken up. 2. The folding board, which can give as many as four surfaces. 3. The counterpoise sliding board arranged like a sash window, where as many as four surfaces can be provided. 4. A wall fitting to hold three medium-sized boards 3 ft 6 in × 4 ft (106·75 × 122 cm) in slots, which can be taken out, interchanged and stored until the diagrams are required again. The last kind is particularly useful as on some boards it may be possible to paint a permanent outline of the continents or countries most often required, or a permanent map of the world. It is often useful too to have one board with a squared surface, so that the lines are visible to the teacher, but invisible from a distance, or one on which the lines have been painted in colours. A raised dais below the chalkboard is useful.

Maps and picture displays

Adequate facilities will be required for the speedy display of the correct wall-map for the particular lesson in question. A great deal of time can be wasted by using out-of-date or inadequate methods. One or more maps may be required during a lesson and they will be required quickly. It is essential too that they do not cover up all the chalkboard space available, as the teacher may well wish to use the board at the same time as the map. It is also necessary for the maps to be clearly visible to pupils at the back of the class as well as the front and sides. As some maps are 8 ft (2·4 m) long ceiling height is also a consideration in selecting or designing the geography room.

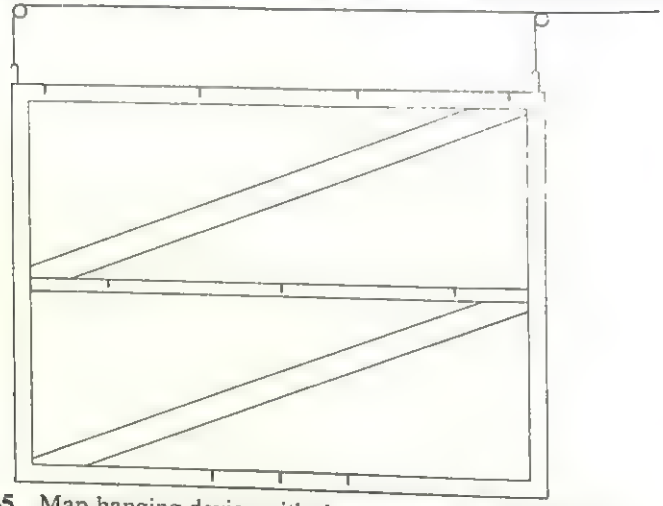


Fig. 45 Map hanging device with three bars to give stability

The best mounting for wall-maps in most common use is to fit them on spring rollers. This however is costly and clearly impracticable for every map which may need to be displayed. The cheapest device for map display is a frame made of wooden battens suspended by piano wires running through pulleys attached to the ceiling (Fig. 45). The maps or pictures are then attached to the frames either by bulldog clips or by hooks fitted at different intervals to allow for different widths of maps. Both clips and hooks will probably be needed as some wall-maps are folded and provided with eyelets whereas others are mounted on rollers. It is better to fit the frame with counterpoise weights so that it can be easily raised and lowered and left above the level of the chalkboard when not in use. A further method is to stretch across the room thin steel cables $\frac{3}{10}$ in (8 mm) in diameter and fixed to two opposite walls by bolts. To these are fitted meat (S-shaped)

hooks of different lengths on to which the maps are affixed. Large pictures which are frequently required may be displayed from here too provided that they are mounted on laths, which project at each end, into which eyelets have been fixed.

A very large area of wall space for display is essential in geography teaching. A pin rail round the room is not adequate; it neither provides a sufficient area nor does it adequately preserve the maps and pictures being displayed as they are not backed by the solid wall. Ample space should be provided both for permanent displays and for small displays which may be required for one lesson only. A map of the local area should be permanently on view; such a map may well cover an area greater than 6 sq ft (5,580 sq cm), and may even cover as much as 8 sq ft (7,440 sq cm). There will also be the constant need to illustrate a central theme of a term's teaching (e.g. the mining and production of oil), which will take up a great deal more space. Space must be allowed for a current affairs chart, the basis of which may be an outline map of the world covered with Perspex, and it is a common class exercise to instruct each pupil to answer questions on individual pictures posted on the wall. It follows therefore that a large amount of wall space will be necessary in the teaching space and that it should be covered with soft board from chair rail to picture rail so that all parts of it can take drawing pins (thumb tacks) and yet provide a pleasant surface which can be decorated. This will mean that whereas full-length windows will be required in the south or west sides (outside the tropics in the northern hemisphere) those in the north or east, if any, should be of the clerestory type which will allow the full use of the wall for display purposes up to a height of 8 or 9 ft (2·4 or 2·7 m). A painted frieze above the picture rail may often serve to illustrate the subject being taught. It can be made to depict the geological time scale, the work of the great explorers, the flora or fauna of other lands, the natural climatic regions of the world or other features of geographical interest. Similarly the ceiling could be painted with the cardinal points of the compass, and an arrow pointing north drawn on the floor.

Teacher's demonstration desk

The teacher's demonstration desk is normally placed in front of the class and below the chalkboard, although it is appreciated that some teachers prefer to do without one and to have a small administrative desk at the side of the room. In general, however, it is a necessary piece of equipment and should be not less than 3 ft (91·5 cm) square in

order that large-scale maps may be laid out flat on top of it. It will probably be more satisfactory to make the dimensions somewhat larger in order to permit of the display of larger equipment. Indeed it can well be used as a cabinet for the storing of large-scale maps, in which case its lower portion should be fitted with pull-out drawers or pull-out shelves. If these are made to take two large-scale Ordnance Survey one-inch maps side by side (2 ft 11 in × 3 ft 5 in; 89 cm × 104 cm) the overall exterior dimensions of the desk would be about 5 ft 3 in × 3 ft 6 in (160 cm × 107 cm) which would be a good size for

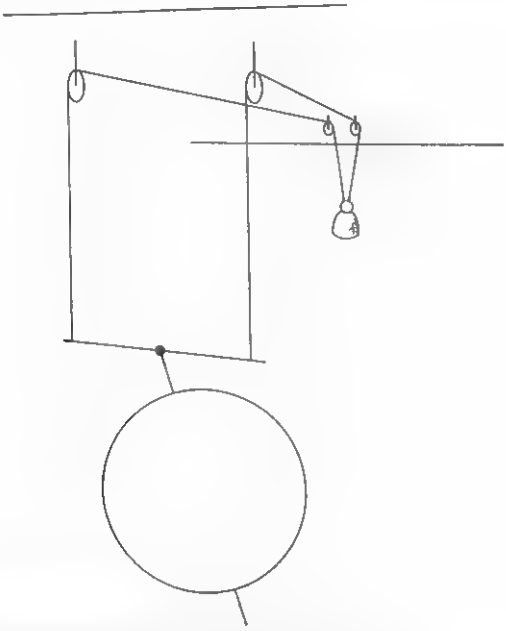


Fig. 46 Hanging globe with counterpoise weight

demonstration purposes. If the lower portion is used for the storage of maps then the teacher should be supplied with separate storage space with lock and key for his valuable equipment. The top of the desk should preferably be of unscratchable and durable material, so that it will not be damaged by geological specimens and experiments which involve the use of water. The height should be about 3 ft 1 in (94 cm) so that demonstrations can be given from the standing position.

Globes

The globe is an essential part of the geographer's stock in trade and should play as important a rôle as the wall-map. Economy here is

therefore to be treated as false and unsatisfactory. Many geographers prefer to have two such globes in the geography room, the first a black one on which the continents have been painted in white and on which both pupils and teacher can draw; the second of the same size and permanently coloured to show the main physical features, towns and communications. In any case, however many are employed, it is desirable for the globe to be suspended from the ceiling within the teaching space, and to be run on pulleys with counter-poise weights, so that it can be pulled down for work or demonstration (Fig. 46). Thus located the globe is symbolic of the earth's position in space and so can be used to demonstrate various aspects of astronomical geography. A globe should be 19 in (48·3 cm) in diameter, if this size can be afforded, but in any case not less than 12 in (30·5 cm). Valuable additions to the suspended globes are the plastic globe on a stand which is easily portable from room to room, and the 'rolling globe' which can be removed from its stand.

Projection facilities

The geography teacher will constantly be needing to use slides, filmstrips, films and the projection of pictures (Chapter 5). All this involves a considerable amount of capital expenditure, but where a department is being built up a start could be made with the 2 in × 2 in (5 cm × 5 cm) slide/filmstrip projector. Nearly all photography today is carried out with 35-mm cameras and the teacher himself is therefore likely to collect a large amount of material of his own; in addition filmstrips are often available on hire or loan. The Episcope (Opaque Projector), which would come next in order of expense, is invaluable for displaying to the whole class pictures out of textbooks and even the pupils' notebooks for the purpose of pointing out mistakes or work of merit. Sound film projectors are costly but it is questionable whether the purchase of a projector which will project only silent films is worth the outlay. The sound projector should therefore be listed as a 'necessary luxury' when the money becomes available, and in the meanwhile can often be borrowed from some other source. In all cases the best table for a projector is the portable trolley with shelves underneath which help to carry the slides and other accessories.

The siting of the screen is most important. If it is to be in the middle of the front wall it should not obscure all the chalkboard as a teacher may well wish to illustrate on the board some theme which he is displaying on the screen. Some teachers prefer to have the screen across the corner of the room, but wherever it is, rearrangement of the class

seating should not be required, since the change from picture to writing and writing to picture should be made as smoothly and quickly as possible. There are many types of rear projection screens available which have the advantage of allowing the teacher to face the class while projecting the pictures. With a number of these, modified or even full daylight conditions are possible. In this case the screen can be placed on the teacher's demonstration desk; but even this is not likely to prove so quick a transformation as pulling down a screen mounted in a box on a spring roller attached to the ceiling, or drawing aside one portion of the chalkboard behind which is a painted screen. A simple roller screen worked by cords wound round the projecting ends of the roller is effective, cheap and easy to repair. From the foregoing it is clear that the blackout of the geography room is a matter of great importance. It must be quick, easily worked and effective. To effect complete darkness, which is essential when using the episcope, dark blinds fitting into slats at the side are the most effective. On the other hand these are expensive, slow and shut a great deal of air from the room. Shutters are worse in this respect, and in the end heavy double curtains with a wide pelmet at the top and plenty of overlap may prove to be the most suitable, for they do allow a modicum of air to pass into the room, and this is a consideration of first importance in a small room containing thirty or forty pupils. Curtains also have the advantage of looking gayer than the average dark blind. In countries where blackout is impossible for climatic reasons use can be made of a rear projection screen especially designed for use in full daylight. It is essential that adequate power plugs should be available at all the points where the projector may be needed and that a switch control should be within reach of the operating positions. A rheostat for dimming the lights to different intensity can be a most useful adjunct, in as much as notetaking during filmstrip projection is to be encouraged. A small flat surface on one wall can be very useful for tracing maps or sketches projected through the slide or filmstrip projector.

Class working area

This should as far as possible be a part of the room where the pupils can get up from their normal desk tables and carry out practical work or consultation without disturbing the teaching which might be in progress in the other part of the room. It will therefore be best situated at the back of the room or the sides but preferably the former, and should be as large in extent as the size of the room will allow. It should include the following equipment:

Tracing table

As so much of geography depends upon the reproduction of maps and much valuable time can be saved in tracing direct into a notebook or on to a sheet of plain paper from a map, without the inconvenience of the intermediate step of using tracing paper, it is desirable that at least one tracing table be provided in the working space. This need be neither money nor space consuming. To save space it can be fitted on top of a map storage cabinet or even the display cabinet may be used for this purpose (see below). It can be made in the school workshop, the only expensive item being the sheet of ground plate glass which forms the top (Figs. 47 and 48).

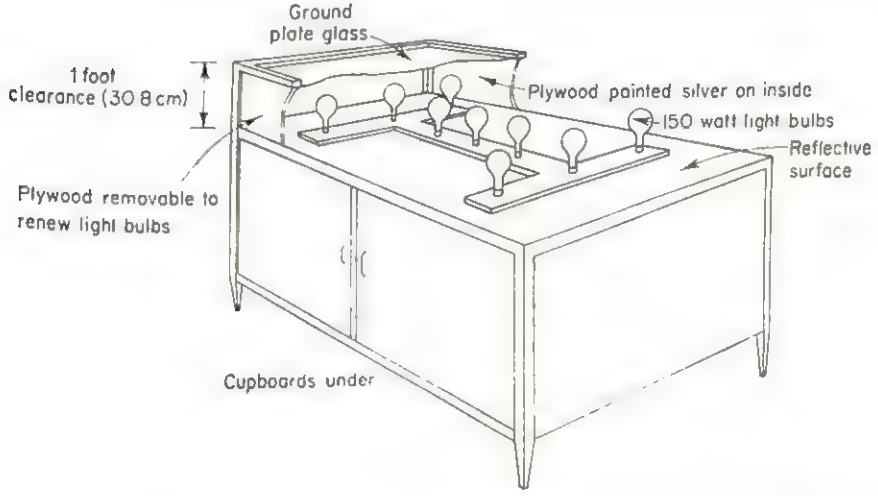


Fig. 47 Tracing table: two possible heights, 3 ft (91·5 cm) and 3 ft 6 in (106·75 cm)

Underneath, it consists of a reflecting mirror which can well be replaced by sheets of tin foil or shiny paper, and a set of powerful lights which may be made to move on a bar or set into two or three fixed bars. Bulbs of 150 watts will be found satisfactory and three of the four sides can be filled in with sheets of reflecting foil. The fourth side should be left open to dissipate the heat generated, or a hinged side may be fitted to keep the inside dust-free. Fluorescent strip lighting will be even more effective as little heat is generated.

Sand-tray

4 ft × 4 ft (122 cm × 122 cm). This is a very useful adjunct for making models as outlined in Chapter 5. If it can be made watertight

and be located near the sink (see below) it can be used also to illustrate delta-formation and river erosion. It need be neither large, costly nor cumbersome.

Water tank

A glass water tank can be used for demonstration of wave forms, ocean currents, salinity, etc.

Work bench

A work bench both for pupils and teacher is useful in any geography room. Model making may play an important part in the practical

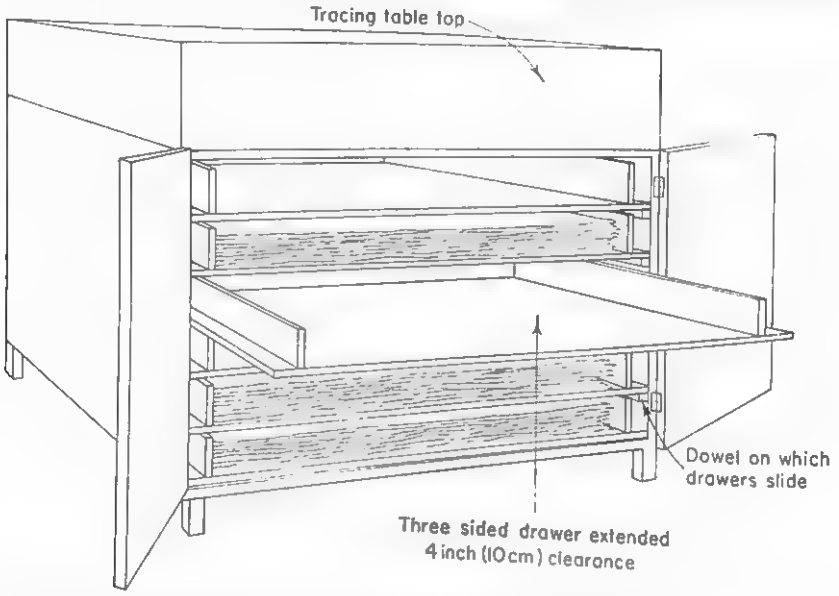


Fig. 48 Map cupboard under tracing table has three-sided drawers to allow easy handling of maps

demonstration of geography lessons and as the subject demands practical as well as academic interest it is important that the pupils be encouraged to use their hands creatively. Moreover the teacher may wish to make models to illustrate his lessons. In addition the geography equipment demands a good deal of routine maintenance. Wall-maps have to be repaired, large-scale maps provided with protective edges, pictures mounted, geological specimens labelled and cut to the right size, glass frames made, museum exhibits prepared, magazines bound, and a host of other jobs done. The bench should therefore have a solid flat top, be about 30 in (76·25 cm) high and 2 ft (61 cm) wide, be as large as space is available, and have ample cupboards

underneath for modelling materials and the storage of half-completed models. It should be fitted with a woodworker's vice, a supply of tools suitably stored, a sink with hot and cold water and a slate slab or zinc top for modelling purposes. It should also have suitably placed electric points and if possible one gas tap in order that glue or soldering irons may be heated, and there should be good overhead or wall lighting. If the bench can be fitted in an alcove or an adjacent storeroom it would make for increased tidiness and limit noise and disturbance to a smaller area.

Display cabinet

In order to display geological or economic specimens for short or long periods the cabinet should be about 33 in (84 cm) high, consist of a series of drawers, should be enclosed in a framework of glass and be lighted with strip lighting. It should be possible to interchange the drawers, so that any one can be placed on top for display purposes, and if the top were made of plain glass and the interior lighting were sufficiently powerful, it might be possible to use it as an occasional tracing table. About 4 ft 6 in × 2 ft 6 in (137·25 cm × 76·25 cm) would make a good size for a display cabinet. Where space is short in the geography room the display cabinet could well be housed in the corridor outside the room.

Observation window

Geography deals with what is going on out of doors and the situation of the geography room in relation to its outdoor surroundings is therefore of the utmost importance. Outside the tropics in the northern hemisphere its windows should preferably face south and there should be easy access to the outside world through french windows opening on to the playing field or on to a balcony or flat roof. A bay with windows facing south, east and west is particularly suitable. Observations in meteorology cannot be made without frequent reference to the weather conditions obtaining. Lessons in surveying should be accompanied by at least a quick look at the instruments during each lesson. Moreover many teachers like to carry out experiments on the differing altitudes of the sun throughout the year or the daily length of its shadow. This can be done with little disturbance if a large table is placed within the south-facing window on which observations can be recorded. Some schools have set aside an alcove for this purpose, others have french windows or a large plate-glass window, but all plans should take into consideration the heat of the afternoon sun. Again the table can have storage space underneath for instruments, graph paper, etc.

Other facilities

Facilities could be made available in the working space for pupils to receive school radio and television programmes. A barometer and a thermometer should be visible in addition to the meteorological instruments in the Stevenson screen.

Storage space

The geography teacher will need adequate storage facilities for his collection of maps, pictures and specimens, and for his projector, surveying and other equipment when it is not in use. If a room of reasonable size can be set aside adjacent to the geography room it can also provide additional work space for small groups of pupils; indeed it might well house the workshop equipment. The store should contain:

Filing cabinet

To accommodate the selection of pictures, newspaper cuttings and articles, examination papers, pamphlets and other information which must be readily to hand if valuable time is not to be wasted in looking for them.

Wall-map cupboard

When maps are folded they can be stored in the filing cabinet; but many wall-maps are rolled and mounted on wooden rollers. They are expensive, and while it is important that they should be stored in such a way that the copies required can be easily located, they should also be well protected against damage and dust. When it is put away each map should be securely and tightly rolled and tied with tapes. If hooks are screwed into the ends of the wooden rollers the maps can then be hung vertically from eyes screwed into the roof of a cupboard. By careful alignment of the screw eyes 30 maps can be stored in a cupboard whose dimensions are 2 ft × 1 ft (61 cm × 30·5 cm) in such a way that each map is visible and readily available (Fig. 49). The height of the cupboard must of course exceed the length of the longest map and some maps today are 8 ft or more long (244 cm). Some countries produce wall-maps which are mounted flat on boards, in which case a separate storage cupboard will be required for this type.

Alternatively the maps can be fitted vertically in the cupboard in spring clips or horizontally rested on pegs. Neither method provides such good protection and both take up more room.

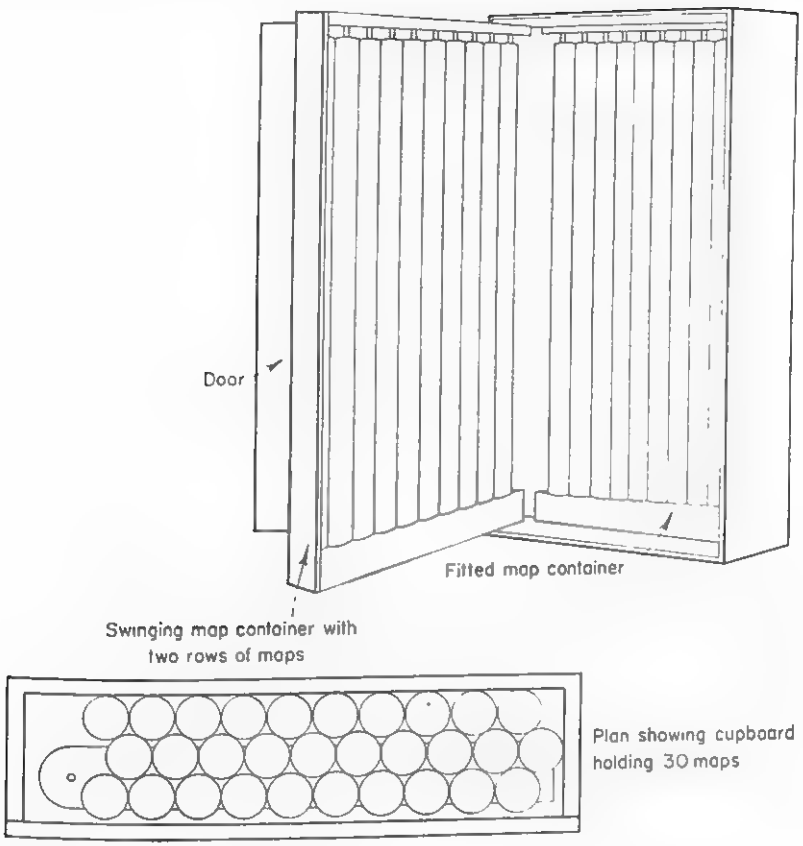


Fig. 49 Wall-map cupboard

Library cupboard

The teaching of geography demands a varied use of reference books, almanacs, tide tables, picture books, etc., and it is imperative that these should be to hand. It is certainly right and proper that the school library should have a representative geography section, but it is important that those books used most commonly for reference should be kept in or near the geography room. Some teachers would prefer them in the room itself; others, particularly where space is limited, would rather they were kept in the storeroom, which in any case may be used as a small study room. They should, however, be kept in a glass-fronted case, and as large reference atlases are often wider than the normal bookshelf, and as magazines spoil the appearance of a glass-fronted case, it would be advisable for the bottom half to be deeper than the top and to have a wooden door.

Map chest

A chest fitted with shallow drawers or pull-out shelves will be required for the storage of large-scale maps if this has not already been provided in the geography room as part of the tracing table or teacher's desk (see above). One drawer will undoubtedly be needed for the storage of maps and practical work produced by the pupils.

Card index cabinet

A useful aid for quick location of wall-maps, large-scale maps, pictures and library books.

Duplicator

The geography teacher needs to do a great deal of duplicating for the production of maps, diagrams and statistics for his pupils; indeed a great deal of time and energy which would otherwise be expended in drawing on the chalkboard and note-taking can be saved in this way. For this reason, unless adequate facilities are available to him in the school office or common room he should have a duplicator (kept in the storeroom) for his own use. Since he will not need to produce a great many copies he should find the spirit type of duplicator simple and clean to use and not too expensive to purchase. This type has the added advantage of allowing duplication in several colours.

General cupboard

A general cupboard with shelves will be required for storing drawings, instruments, meteorological instruments, drawing materials, stationery, filmstrips, slides, etc.

If the store can be thoroughly darkened and the sink unit is fitted therein it can be used as a photographic dark room. Similarly, if it is adjacent to the geography room, pictures can be projected through a flap in the intervening wall on to a mirror at the back of the storeroom and back again to a translucent screen facing the pupils in the geography room. In this case a throw of 8 ft (24 m) is required with a lens of 4 in (10·2 cm) focal length to give a picture of 30 in (76·25 cm). The storeroom must be properly darkened to prevent loss of intensity.

Conclusion

The idea of a separate room for the geography teacher was first put forward towards the end of the nineteenth century. By the middle of the twentieth century the geographer has at last received due recognition and has persuaded education authorities and school architects

of the absolute necessity of providing a special geography room or laboratory. Many teachers will not be fortunate enough to have a room built for them and will have to be content for the time being with the conversion of an existing classroom. The three essential requirements are adequate seating and table arrangements for the pupils, plenty of chalkboard space, and a large area of wall available as a bulletin board. Lighting should be good, whether daylight or artificial, and there should be adequate power points for projection purposes, and switches suitably placed so that the teacher can control the lighting from the point where he is working the projector.

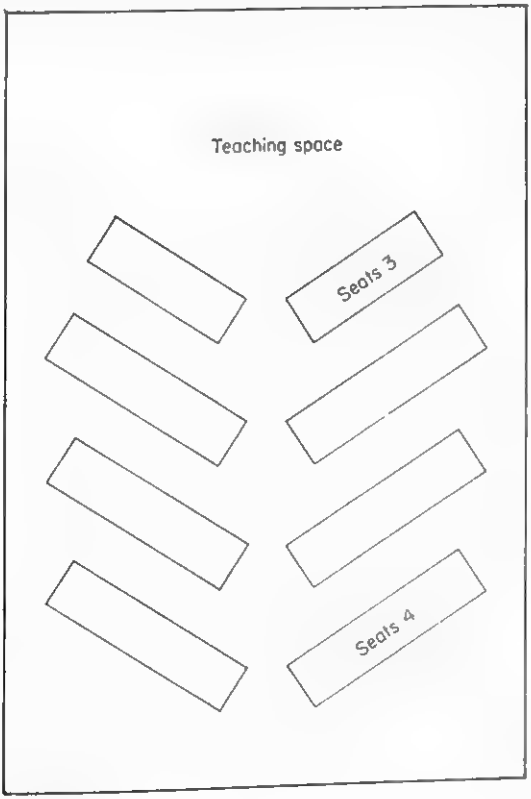


Fig. 50 Teaching-space

Geography rooms, of a sort, for thirty pupils have been made out of areas of only 600 sq ft (56 sq m), using tables $3\frac{1}{2}$ ft $\times$ 2 ft (106·75 cm $\times$ 61 cm) for two pupils, or tables 3 ft $\times$ 4 ft (91·5 cm $\times$ 122 cm) for four pupils with two on each side; but such an arrangement leaves little space for movement (Fig. 50). Much can be done with 720 sq ft (67 sq m), using half for teaching and working space, and half for class-seated area (Fig. 51), but even then the pupils will be too near the

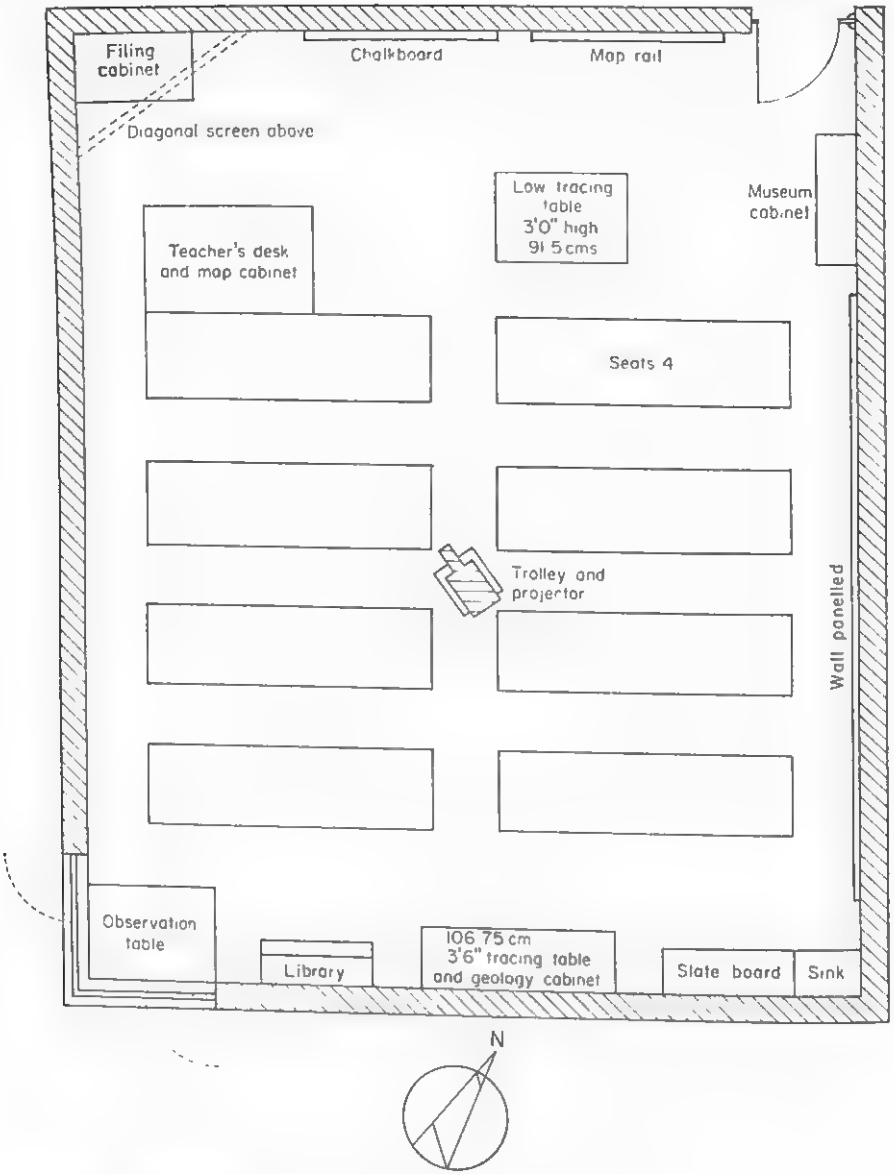


Fig. 51 A classroom converted into a geography room

front wall, and those on the outside will be unable to see the board clearly as their angle of sight will be too acute—an angle greater than 30° from the centre line of vision will give a distorted picture. It is therefore the geographer's responsibility to impress upon education authorities the need for proper accommodation and equipment both

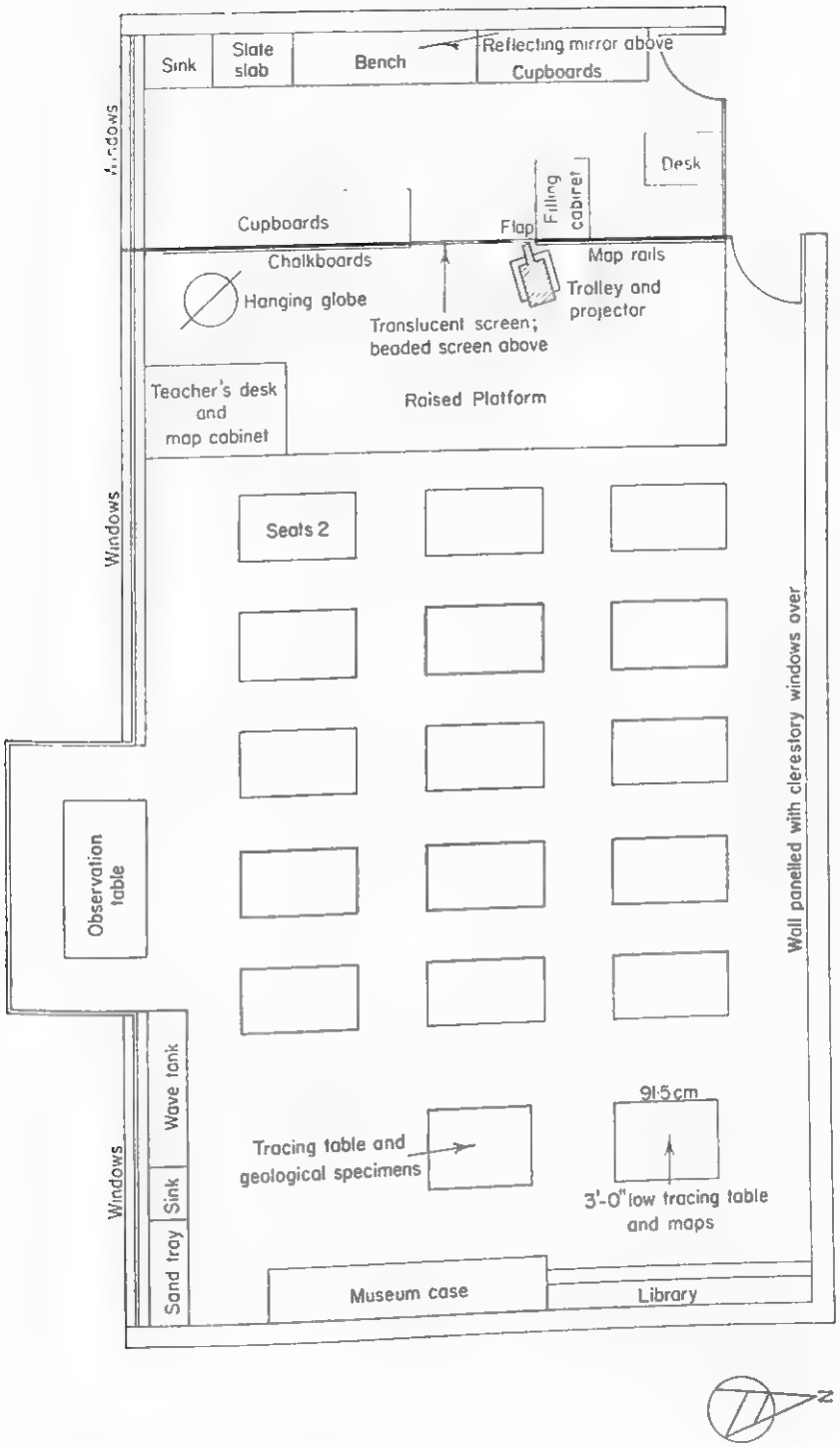


Fig. 52 Outline of a geography room

for class and teacher, and to be able to offer detailed practical information as to his requirements. A suggested ideal area for a geography room (Fig. 52) might be 1,025 sq ft (93 sq m) for thirty pupils, with an additional 200 sq ft (18·5 sq m) for the adjacent store. It may of course be necessary to make modifications according to the circumstances. The smaller the area available, the more important becomes the need for the separate store. But whatever the limitations of size, the geography teacher can do a great deal provided that he has his own centre, well equipped, and with adequate projection facilities.

7 The organization of geography teaching

A CLEAR definition of the subject, appropriate techniques and suitable teaching aids and reference sources providing information that is kept constantly up to date are all needed if geography is to be well taught. In addition, geography must be given its proper place in school syllabuses and timetables and—a matter of primary importance—the teaching of the subject must be in the hands of competent teachers.

Syllabuses

To take the question of syllabuses first, it would be absurd, in a book of this kind, to seek to lay down standard geography syllabuses suitable for all the schools in the world. It is for the education authorities in each country, and sometimes in each province or constituent state of a country, to decide the place to be given in the syllabus to the study of one country rather than another or to that of a particular zone or continent. Any attempt at uniformity in this respect would be bound to fail. On the other hand, it will be useful to give a few indications of a general character concerning the various stages in the teaching of the subject in relation to pupils' age groups, and also concerning the range of information appropriate to each of these age groups.

Age groups

According to the Swiss psychologist, Emile Marmy, three successive levels of comprehension can be distinguished in children and adolescents, requiring—

(*a*) *The unspecialized overall approach* at elementary school level (ages 6–8 to 10–11).
(*b*) *The formally geographical approach*, at middle school or lower forms of the secondary level (ages 10–11 to 14–15).
(*c*) *The genuine scientific approach* in the upper forms of the secondary level (ages 14–15 to 18–19).

Geographical concepts[1]

In the primary school

The first of these levels corresponds chronologically to what psychologists call the third stage of childhood, i.e. to school entry age. At this stage, the child's mind does not apprehend geographical facts as differing in kind from other facts which are non-geographical, so that in the elementary school, geography may not be taught in separate lessons. The youngest schoolchildren like to learn by observation and by action. They are at the age of free expression and eagerness and their school work is organized around 'centres of interest' with active methods predominating. From the age of nine, however, it is desirable to introduce rather more order into the child's empirical knowledge. Usually he is able to read; he has a lively imagination and a rapidly developing memory, and his curiosity acts as a spur to learning

During the final years of the elementary course, children can acquire a basic geographical vocabulary and learn the principal characteristics of their region, their country and foreign countries, even if these ideas remain more or less empirical and are grasped intellectually only at a later stage.

Primary education is intended to equip pupils with the fundamental mechanisms of reading, writing and arithmetic and to instil some basic mental concepts such as notions of time, space and, up to a point, causation. Geography can be a help in regard to *reading*, *oral expression* and *written expression* (writing and drawing), but is even more useful as a vehicle for arithmetic since the teacher often talks to his pupils about breadth, height and area. Geography further contributes —and this is its essential task—towards giving children an understanding of the *notions of cause and effect and space*. It trains the pupil to fix the positions of places and to calculate and compare distances between places, whether personally known to him in his own environment or seen on a map. These exercises are very simple but extremely instructive and give this kind of geography teaching an unchallengeable place at the primary level.

Junior and senior secondary school

At junior level, with the 11-year-olds, there is already a better understanding of geography. The child is progressing from specific details to more general ideas. His approach may be described as geographical, but in the pre-scientific manner. This second educational phase corresponds to the period of adolescence, which can be a diffi-

1. In this connexion, see the beginning of Chapter 3.

cult one for some children and is marked by active periods followed by periods of consolidation, of withdrawal within themselves. Nevertheless this is an age at which reasoning plays an increasing part and geography should help towards developing the pupil's process of logical thought and synthesis, as he progressively reasons out the ideas which he stored up in his mind earlier on but could not differentiate.

However, it is only at the final stage, in the upper part of the secondary school, that geography becomes explanatory and that the study of the relations between phenomena takes the leading place, and by then the student is a youth and is becoming an adult who is preparing for his university studies. The range of knowledge promoting the development of a geographical culture and a geographical outlook is very wide. The ability to use the notions already acquired in order to acquire fresh notions—that is to say, a cultivated mind—is the supreme aim of secondary education. A concrete, lively and active geographical education brings all the student's intellectual powers into play. In the light of what has been said the observations on syllabuses which follow should be regarded merely as pointers or guide lines for planning geography teaching on the spot and for ensuring that it is adapted to the intellectual level of the class concerned.

Outline of a general geography syllabus

ELEMENTARY LEVEL

The children to be taught are from 6-8 to 10-11 years old and the object is to enable them to acquire an exact vocabulary and as concrete a picture as possible of the phenomenon or thing which each term designates. It is also possible to lead them to discover some interrelations between the phenomena observed, some elementary associations. The essential aim at the primary level remains, however, the acquisition of the basic notions and facts.

Basic notions

These relate to direction (compass points), distance and area, the movements of the earth causing the alternation of day and night and the seasons, and the observation of local space (plans of the classroom, and the surroundings of the school) by contrast with terrestrial space viewed on a globe or world map with the continents and oceans.

Basic natural facts

These are primary phenomena which children can be made to observe directly or indirectly:

Heat and cold.
Humidity and aridity.
Weather.
The water cycle.
Land: soil, rocks, slopes, crests, hollows.
Streams and lakes.
Natural landscapes: forest, grassland, desert.

Teachers can also try to get children to grasp the primary—the simplest—relationships between these phenomena.

The basic human facts

These are the facts which illustrate the action of man on nature:

The peopling of a locality, region, continent.

Migrations and mingling of populations.

Number of inhabitants and the relationship between this figure and the facts of nature.

Points of resemblance between men (need for food, housing, work, rest, cultural activities, exchanges).

Differences between men (styles of dress, kinds of food, kinds of housing).

The variety of languages, ethnic groups, beliefs, techniques and tools.

The basic geographical facts

These are the features of landscapes which reveal the various interventions of man. Examples can be seen in dwellings, which vary widely in type over the world from tents and igloos to skyscrapers. Such dwellings are either scattered, as in the case of farms in the countryside, or concentrated in hamlets, villages and towns. Other examples are the forms of soil use and the different ways in which men work: arable farming and stock farming, mining and quarrying, lumbering and fishing. Yet other basic facts are the concentration of workers in urban factories, shops and offices, communications and means of transport.

SECONDARY SCHOOL (LOWER FORMS)

Geography teaching at this level is addressed to children ranging from 10–11 to 14–15 years of age, capable of assimilating geography which is more 'intellectual', more technical and synthetical, provided they have thoroughly absorbed the fundamental ideas. It is based on the local environment and the landscapes of the region which, once they are thoroughly understood, will serve as the starting point, the introduction, for the study of less familiar and more distant areas. The studies of many pupils do not go beyond the junior secondary school, and geography would have failed to fulfil its task if it did not provide these future citizens with the essential equipment of knowledge useful in life.

The local environment

The purpose of studying the local environment is to bring the pupils into contact with real facts: the school and its surroundings, the village or town with its various quarters, its site, population and activities, and finally the natural environment, relief, climate, water supply, vegetation, and the way in which the area has been developed.

Natural environments and landscapes

The study of one's own region is the first step towards giving geography a concrete meaning. It is the best way of presenting pupils with a notion of the world in the form of aspects of local or regional landscapes or of major combinations represented by natural landscapes. What geography offers to the pupil is to enable him to discover for himself the correlations between his local environment which he knows and other environments that lie beyond his range, and to do this with the help of documentary material (maps, illustrations, descriptions).

Natural environments fall into broad world-spanning categories; thus we have:

Forest environments, some of them in tropical countries and others in temperate countries.

Semi-arid environments: savannahs, steppes and prairies.

Desert environments, some of them hot and others cold.

Some environments represent a combination of more complex factors calling for more intricate analysis and explanation. Examples are:

Mediterranean environments.

Asian monsoon environments.

Mountain environments.

The peopling of the world and zones of civilization

The study of the natural landscapes will have served to introduce the pupil to the study of human geography. Thereafter the problems of the peopling of the world can be entered upon by lessons on:

The distribution of mankind over the earth.

Zones and types of civilization.

The utilization and organization of space by man

How did man come to take possession of certain environments? There is a wealth of examples, but we shall mention only the main ones taken from rural environments, such as:

Man and water: the creation of oases and polders.

Man and mountains: pastoral activities, transhumance, terrace cultivation.

Man and mineral resources.

Man and forests.

Man and cultivated plainlands, variety of agrarian systems.

Towns and industries

Since the end of the eighteenth century the Industrial Revolution has brought about a flow of population into urban environments. Other examples will explain these phenomena:

The development of towns.

Types of town according to function.

Industrial centres and regions.

Types of industry.

The economic life of the world

A further consequence of the Industrial Revolution has been the development of commercial relations on a national scale and between

nations. Some countries have surpluses available, while others need foodstuffs and raw materials because they do not produce enough of them. Subjects for study will therefore be:

Countries which produce and sell primary produce.

Countries which buy and consume primary produce.

Communications and means of transport.

The rôle of ports and commercial centres.

Road, rail, sea and air links.

SECONDARY SCHOOL (UPPER FORMS)

Here we are dealing with older pupils who rank in several countries as undergraduates. This makes teaching possibilities much wider since these young people can reason, seek relations of cause and effect between phenomena and take part in the work of groups. Accordingly the syllabus will be wider than for junior secondary schools. Again it begins with a study that is zonal, but comprehensive this time and no longer confined to natural environments. It goes on from there to the study of the political and economic organization of the contemporary world.

The geographical zones of the world

The programme which should be followed for the study of each zone comprises the analysis of the following elements:

Natural environment, its components, its dynamic conditions affecting the way it has been peopled, utilized and adapted by man.

The conditions affecting its economy in the primary sector (agriculture, natural resources), secondary sector (industries) and tertiary sector (transport, commerce).

There are several ways of dividing the world into geographical zones. The following is given purely as a suggestion:

1. Humid tropical zone (equator)
2. Dry tropical and subtropical zone
3. Mediterranean regions
4. Subtropical regions on the eastern edges of continents
5. Seaboard temperate regions

6. Mid-latitude regions with continental climate
7. Cold and polar zones.

The political and economic organization of the world

The syllabus here suggested, like the preceding one, can be modified according to teaching needs. The following are its main sections:

1. The political division of the earth's surface
2. The economic life of the world—
   currents of trade
   international trade.
3. Economic problems of the world—
   major economic groups
   underdevelopment.
4. The demographic problems of the world—
   the growth of population
   overpopulation
   diseases and natural and social catastrophes.
5. Specifically geographic problems—
   policies of 'changing the geography' and territorial development
   policies and problems of developing countries
   problems of the growth of towns.

Outline of a regional geography syllabus

Division into four parts

Obviously it is only possible to offer suggestions about the general lines of regional geography syllabuses. It is the geographical situation of the country itself, or sometimes of the school, which will suggest their specific composition.

The teaching of regional geography splits up into four parts;

1. *Local and regional geography*, directed to knowledge of the locality where the school is situated and the province or administrative region of which it is a part.
2. *National geography*, or the geography of the state, which is an important element in the civic training of the future citizen.
3. *The geography of the continent* where the state is situated.
4. *The geography of the other continents.*

Choices open

Within this very loose framework, education authorities and teachers can exercise numerous options. The continent or other continents may be dealt with in detail, taking each state in logical order, or alternatively the approach may be more 'overall' in character, taking the states in large homogeneous groups (e.g. the Andean States, West Africa, the Middle East, etc.). Or, lastly, only the most important or the most characteristic states may be dealt with or even 'geographical samples' of the continent may be selected.

National geography (or the geography of the state) can likewise be taught on a systematic basis—relief, climate and vegetation, population, the countryside, industries, towns—or region by region.

The geography of the continents, again, can be dealt with in terms of major climatic-botanic zones and the states of the tropical, desert and temperate zones respectively can be presented under those headings.

In that case the regional geography syllabus can be linked up with the general geography syllabus which we have already outlined for upper forms of secondary schools.

In planning the teaching of regional geography, it should be taken as a guiding principle that the important thing is not to instil encyclopaedic knowledge but to give pupils a knowledge, an image, of a particular continent or region in true perspective. Often, however, the geographical treatment of a country becomes more and more general the more distant it is from the school or college.

Landscapes compared

It is, of course, quite reasonable that pupils should be better informed about the geography of states bordering upon their own country but it is not reasonable that the true features of landscapes, or the actual pattern of land use, should be misrepresented by a change of scale. For instance, if the class is studying its own country's geography on a 1 : 100,000 map, the geography of a state on the other side of the world must not be taught from a 1 : 10,000,000 map even if the state in question is very vast. On the contrary, its landscapes should be described and explained in 1 : 100,000 terms with the help of samples and examples. And this should be done in such a way that the pupils picture to themselves what the landscapes are really like and how the shapes of the fields, the layout of the farms, the road

surfaces, the architecture of the houses, the height of the trees, the slopes of the hillsides and the breadth of rivers differ from or resemble what they are accustomed to in their own region.

The distribution of syllabus items

There are many ways of distributing the content of regional geography syllabuses amongst the different years of study. Local, state and continental geography should be repeated at all three levels of education. Again, the number of possible combinations of general and regional geography is very great. They may be taught quite separately in different years or both may be taught in conjunction in the same year, local and regional geography, for instance, serving to define and identify the data and concepts of general geography.

Practical considerations

Timetables, practical work, excursions, co-ordination with the rest of the school syllabus

The organization of geography teaching is conditioned by the following considerations:

1. The number of hours per week which can be set aside for this subject. It can be reckoned that the minimum is one hour per week at the elementary and junior secondary levels and two hours per week at the senior secondary level.
2. Whether it is possible to organize special periods for practical work over and above the lesson periods. In secondary school classes, for instance, a one-hour period weekly can be arranged for groups of not more than fifteen pupils, so that, with thirty in a class, each pupil would have a period of practical work every fortnight.
3. The possibility of organizing 'field work' periods (the 'field' being the district in which the school is located or the countryside or a neighbouring industrial region).
4. The possibility of dovetailing the geography syllabuses with those of the other subjects taught. For instance, lessons on elementary astronomy, and on the rotation of the earth, the measurement of longitude and latitude, can be given by the mathematics teacher; lessons on rocks by the natural science teacher; some lessons on climatology by the physics teacher; lessons on the growth of societies by the history teacher, etc.

The geography teacher

Syllabuses may be devised with the utmost possible skill, but the value of geography teaching depends entirely upon the teacher who gives it. Unfortunately the teaching of geography is often combined with that of one or more other subjects, such as history, natural science, languages or social studies. This situation can of course be defended on educational grounds, in particular on the ground that very few periods are set aside for the subject in each class. Anyone who taught only geography would have too many classes on his hands and would find it difficult to know his pupils. This is a perfectly valid argument, but it is easy to meet it with another. The geography specialist's belief in his subject and the interest he takes in the latest developments in it give him an influence and a background which infinitely surpass in value those of the 'jack-of-all-trades' teacher who may know his pupils better but who may well be teaching geography only because he has to. This observation is applicable especially at secondary school level, since experience has shown that, with two periods of geography per class per week, geography specialization is desirable when the school has the good fortune to have geographers amongst its staff.

What must be avoided above all is for the authorities of the school to regard geography as a completely unimportant subject which can be taught by someone with no special qualifications or training and can therefore be delegated to French, history or science teachers, for instance, to fill up their personal teaching schedules. It is precisely because geography is a complex discipline standing at the meeting point between the natural sciences and the human sciences, because it has an approach of its own and because it requires special techniques (interpretation of maps, aerial photographs and cartography), that it needs teachers who are specialists in just the same way as do the biological sciences or physics and chemistry.

Hence, it is impossible to over-emphasize the need for the professional training of geography teachers, particularly those of secondary schools since they have to be specialists, but also of the geography teachers of primary schools who are not specialists in the subject but must nevertheless be able to teach the basic elements and inculcate the vocabulary which their pupils will use throughout their whole lives.

Specialist training for the first category of teachers is given at university level, while for the second category it is given in teacher-training colleges but, in the best interests of both groups, it is an

excellent thing to arrange periodical refresher and information meetings at regional, national or even international level.

In an age when cultural exchanges are increasingly frequent and are becoming ever more easy, teachers and education authorities conscious of their responsibilities must combine their efforts to give geography the standing at all levels of education which its intrinsic value warrants.

8 Sources of documentation

GEOGRAPHY IS a subject that calls for the fullest possible documentation alike for those who teach it and for the pupils who study it. Hence teachers need to keep themselves permanently abreast of the progress of geographical science and of everything which can supplement their professional training both from the scientific and the pedagogical points of view. What they learned at the teacher training college or the university cannot be regarded as anything more than the first step in their apprenticeship and they would quickly fall into a stultifying routine if they did not constantly seek to add to their knowledge. However, serving teachers have little time to browse in libraries and they are often compelled by circumstances to hunt down, on their own, documentation suited to their needs. For that reason it may be useful to show, by way of example, the lines along which geography teachers should direct their quest for information with a view to enriching their own libraries and those of the schools in which they serve.

Periodicals

To keep his information up to date, the teacher should in the first place consult the educational reviews published in his own country and, in particular, those concerned with geography and related subjects. It will probably be surprising to learn that the world total of periodicals relating to these disciplines is approximately 1,600. Information concerning them (title, publisher and place of publication) will be found in the following list. The starting date of publication and periodicity of each is given.

HARRIS, CHAUNCY D. and FELLMANN, JEROME D. *International List of Geographical Serials*, Chicago, Department of Geography, University of Chicago, 1960, pp. lix, 194.

Many of these reviews are, of course, scientific journals the purpose of which is to publish research papers, while others aim at communicating geographical knowledge. There is, however, a certain proportion specially intended for the guidance of geography teachers. There follows a selected list of the reviews of this kind which are published in some twenty different countries.

Boletim geográfico. Rio de Janeiro, Conselho Nacional de Geografia, Avenida Beira Mar 436, 1943. 6 issues a year.

Bombay Geographical Magazine. Bombay, Geography Department, Parle College, 1953. Annual.

Bulletin of the Education Committee. Montreal, Canadian Geographers Association, Geography Department, McGill University, 1956. Irregular. In French or English.

Czasopismo geograficzne. Wrocław, Polskie Towarzystwo Geograficzne, Plac Uniwersyteck 1, 1923. 4 issues a year.

Dějepis a zeměpis ve škole. Praha, Státní Pedagogické Nakladatelství, Ostrovni 30, 1959. 10 issues a year.

Erkunde in der Schule. Hagen, Wilhelm Pieck Verlag, Brinkstrasse 58, 1956. 12 issues a year.

Geografia nelle scuole. Napoli, Associazione italiana degli insegnanti di geografia, via F.M. Briganti 154, 1955. 24 issues a year.

Geografia w szkole. Warszawa, 'Ruch', Wilcza 46, 1948. 6 issues a year.

Geografija v škole. Ministerstvo prosveščenija RSFSR, 3 proezd Marinoj Rošči 41, 1934. 6 issues a year.

Geografisch tijdschrift. Groningen, J. B. Wolters, 1948. 6 issues a year.

Geografiska notiser. Stockholm, Geografilärarnas riksförening, Stockholms Högskola, 1943. 4 issues a year.

Geographical Review of India. Calcutta, Geographical Society of India, Senate House, 1936. 4 issues a year.

Geographie/Aardrijkskunde. Gand/Gent, Fédération belge des géographes/Belgische Federatie van Geographen, 14 rue de l'Université/Universiteitstraat 14, 1948. 4 issues a year.

Geographische Gesellschaft in Wien; Mitteilungen. Wien, Judenplatz 11, 1857. Irregular.

Geographische Rundschau; Zeitschrift für Schulgeographie. Braunschweig, Georg Westermann Verlag, 1949. 12 issues a year.

Geography. Journal of the Geographical Association. London, G. Philip & Son, Victoria Rd, London, N.W.10, 1901. 4 issues a year.

Informaciones geográficas. Santiago de Chile, Instituto de Geografía, José Pedro Alessandri 1027, Casilla 147, 1951. Annual.

Information géographique. Paris, J. B. Ballière et Fils, 19 rue Hautefeuille, 1936. 5 issues a year.

Journal of Geography. Chicago, National Council for Geographic Education, A. J. Nystrom and Co., 3333 Elston Avenue, 1902. 9 issues a year.

Nigerian Geographical Journal. Ibadan, Nigerian Geographical Association, Department of Geography, University College, 1957. 2 issues a year.

Shin-Chiri (The new geography). Tokyo, Nippon chirikyoiku gakkai (Association for Geographical Education in Japan). Tokyo Gakugei, Daigaku Chirigaku Kenkyushitsu, 3–35 Shimouna-cho, Setagaya-ku, 1947. 4 issues a year.

Tydskrif vir aardrykskunde/Journal of Geography. Stellenbosch, Society for the Teaching of Geography, Department of Geography, University of Stellenbosch, Cape Province, 1957. 2 issues a year.

Zeitschrift fiir den Erkundeunterricht. Berlin (German Democratic Republic), Volk und Wissen Volkseigener Verlag, Lindenstrasse 54A, 1949. 12 issues a year.

Bibliographies

The geographical journals deal with current subjects and mention newly published books but there are also series devoted to geographical bibliography some of which are regional or national in scope and others international. It is these bibliographies that the teacher should consult for additions to his library. The list which follows gives those of them which are international in scope.

Principal international bibliographies of geography

Bibliographie géographique internationale. Paris, Centre national de la Recherche scientifique, 15 Quai Anatole France, 1891. Annual.

Current Geographical Publications. New York, American Geographical Society, Broadway at 156th Street, 1938. 10 issues a year.

Canada. Department of Mines and Technical Surveys, Geographical Branch. *List of acquisitions*. Ottawa, 1948. 12 issues a year. Also published in French.

New Geographical Literature and Maps. London, Royal Geographical Society, 1 Kensington Gore, 1951. 2 issues a year.

Polska bibliografia analityczna; Geografia. Warszawa, Polska Akademia Nauk, Krakowskie Przedmiescie 30, 1956.

Referativnyi žurnal; Geografija. Moskva, Akademija nauk SSSR, Institut naučnoj informacii, 1954. 12 issues a year.

Westermanns geographische Bibliographie. Braunschweig, Georg Westermann Verlag, 1955. 10 issues a year.

Cartography

Bibliographie cartographique internationale. Paris, Librairie Armand Colin. Irregular.

International yearbook of cartography. London, George Philip. 1961.

Many countries have also national associations of geographers whose members consist of specialists in this subject and teachers. In any case, there is an international body whose object it is to invite all the geographers of the world to meet periodically for the purpose of discussing their common problems. This body is the *International Geographical Union*, and it has published the following list of the world's principal geographers:

E. MEYNEN. *Orbis geographicus 1960*. Wiesbaden, Franz Steiner Verlag. GmbH., 1960. xxv, 605 pp.

A succinct international bibliography

It is salutary for teachers to ponder the nature of geography, the methods for teaching it and its content—in a word, its pedagogy—as seen today by those concerned with these problems. To guide their investigations, to focus their reflections and provide matter for their discussions, geography teachers are advised to consult some of the books or articles mentioned below. It has been necessary to restrict this list, which is already extremely long, to works which have appeared during the last ten or fifteen years on the teaching of geography, and to omit textbooks and treatises, though these are basic for the pedagogic training of teachers. The list does, however, include the most important atlases, or at least those mentioned in the lists consulted. There are those who think it would have been preferable to give only a short bibliography with notes on the items. However, the present writer could have followed this procedure only in the case of works published in French and English. It was felt it would be more useful to compile a bibliography covering the main countries of the world. It should be noted that the list of references varies in each of the versions of the *Source Book*. Thus the French edition gives only the essential references in English and Spanish, the English edition does the same for French and Spanish works, while the Spanish edition gives only a limited number of references to French and English works. The references to works in languages other than these are identical in all three editions. Omissions will no doubt be noted, and the author would be grateful to have his attention drawn to them for

the purposes of a later edition. Finally, it must be pointed out that neither the authors of the *Source Book* nor Unesco are responsible for the ideas, opinions or facts presented in the works listed.

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BARNARD, H. C. *Principles and practice of geography teaching*. London, University Tutorial Press, 1948. 235 pp.

BAYLEY, T. *The craft of model making*. Leicester, Dryad Press, 1960.

BRIAULT, E. W. H. and SHAVE, D. W. *Geography in and out of school. Suggestions for the teaching of geography in secondary schools*. London, Harrap, 1960. 199 pp., illus.

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GEOGRAPHICAL ASSOCIATION. *Sample studies*. Sheffield, 1960. 64 pp.

GEOGRAPHICAL ASSOCIATION. *Teaching geography in junior school*. Sheffield, The Association, 1959. 46 pp., illus.

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GOSPILL, G. H. *The teaching of geography*. London, Macmillan, 1956. 316 pp.

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Atlases

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Atlas historico y geográfico de Africa española. Madrid, Dirección General de Marruecos y Colonias e Instituto de Estudios Africanos, 1955. 197 pp.

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Die Wereld en sy mense. Atlas vir Suid-Afrikaanse skole. Amsterdam, Djambatan, n.d. 48 pp., 67 maps.

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Teaching material

The search for reference material is not confined to written sources. Teachers who wish to use active methods to enliven their teaching will be anxious to equip their classes, particularly when they have a geography room, with the audio-visual material recommended in the preceding chapters—wall-maps and other maps, terrestrial globes, photographs, slides, films and filmstrips. The first question that arises, however, is that of finance. Even if the teacher can obtain the requisite funds from the school authorities, he will still have to prove that the material he wants is useful, even necessary, and he will have to participate in its selection.

The procedure varies with the country and with the commercial practice of manufacturers and suppliers of school materials. Where the latter are numerous and there is much competition, they issue catalogues, often very full, advertise in educational journals and even send representatives to schools to give demonstrations. Where this is so, teachers can make a discriminating choice in drawing up the list of their needs. Elsewhere they will have to be satisfied with selecting from catalogues and from amongst the novelties concerning which they may have read technical accounts in the specialized journals. Lastly, in those countries where teaching material is scarce or overdear, they will have to use their ingenuity, to find for themselves, or to construct with the help of colleagues or pupils, the minimum equipment, details of which are given in Chapter 5.

Within the limits of this *Source Book*, it is hardly possible to indi-

cate even succinctly the main manufacturers and suppliers of material that can be used for geography teaching. There are firms with international reputations in most of the world's chief countries. Teachers can secure information on this matter from the periodicals mentioned at the beginning of this chapter. However, it is felt that the list which follows will be of some help. In it will be found first of all addresses of distributors of films, filmstrip and slides, from whom material of this kind can be procured by purchase, on hire or on loan. It has also been thought advisable to include the addresses of the main associations of professional geographers and geography teachers, of geographical societies and institutes and of general reference centres which can, to the writers' personal knowledge, supply information on the country or on the part of the world in which they have their headquarters. The list of these organizations, which grows yearly, is impressive. It is evidence of the world-wide interest in geography and of the almost universal solidarity of those concerned with it whether as geographers or as teachers.

A selected list of helpful addresses

A Suppliers of photographic material such as slides, films and filmstrips.
B Associations of geographers, geographical societies and other bodies likely to supply information.
C General centres of educational information.

1. EUROPE

UNITED KINGDOM AND IRELAND

A Aerofilm & Aero Pictorial Ltd
4 Albemarle Street
London W.1

Boulton-Hawker Films Ltd
Hadleigh, Suffolk

British Transport
25 Savile Row
London W.1

Central Office of Information
distributed by H.M. Stationery Office Sales Office
Kingsway, London W.C.2

Children's Film Foundation Ltd
6–10 Great Portland Street
London W.1

Common Ground Filmstrips
The Educational Supply Association
44 Fulham Road
London S.W.3

Diana Wyllie Ltd
3 Park Road, Baker Street
London N.W.1

Educational Foundation for Visual Aids
33 Queen Anne Street
London W.1

Educational Productions
East Ardsley, nr. Wakefield
Yorkshire

Educational & Television Films
164 Shaftesbury Avenue [Ltd
London W.C.2

Gateway Film Productions
470 Green Lane
Palmers Green, London N.13

G.B. Film Library
1 Aintree Road
Perivale
Greenford, Middlesex

Ministry of Education, Informa-
Visual Aids Office [tion Dept,
Curzon Street House
London W.1

National Film Institute of Ireland
65 Harcourt Street
Dublin

Photographic Section
Bord Failte Eireann
Dublin

Reference Officer
British Overseas Airways Cor-
Stratton House [poration
Piccadilly, London W.1

Scottish Central Film Library
16/17 Woodside Terrace
Glasgow C.3

The British Council
Film Department
65 Davis Street, London W.1

The Educational Department
Hulton Press Ltd
Hulton House
Fleet Street, London E.C.4

The Educational Supply Associa-
Pinnacles, Harlow, Essex [tion

The House of Grant
91–93 Union Street
Glasgow C.1

B Field Studies Council
9 Devereux Court
Strand, London W.C.2

Geographical Association
343 Fulwood Road
Sheffield 10

Geographical Society of Ireland
19 Dawson Street, Dublin

Royal Geographical Society
1 Kensington Gore
London S.W.7

Royal Scottish Geographical
Synod Hall [Society
Castle Terrace, Edinburgh 1

C University of London
Institute of Education
Department of Geography
Malet Street, London W.C.1

FRANCE

A Cinémathèque centrale de
l'enseignement public
4 rue des Irlandais
Paris 5e

Direction de l'Information
Conseil de l'Europe
Strasbourg

Editions Larousse
13 rue Montparnasse
Paris 6e

La Documentation française
16 rue Lord Byron
Paris 8e

Librairie A. Colin
103 boulevard Saint Michel
Paris 5e

Librairie Hachette
79 boulevard Saint Germain
Paris 6e

Librairie Hatier
8 rue d'Assas
Paris 6e

B Association des Géographes
191 rue Saint Jacques [français
Paris 5e

Société des Professeurs d'Histoire et de Géographie
105 avenue de la République
Paris 11e

C Centre National de Documentation Pédagogique
29 rue d'Ulm
Paris 5e

Direction Générale des Affaires culturelles et techniques
37 Quai d'Orsay
Paris 7e

BELGIUM AND LUXEMBOURG

A C.E.C.A.
Communauté Européenne du Charbon et de l'Acier
Service d'information
Luxembourg

Cinéma Educatif et culturel
10 rue de l'Orme
Bruxelles

Conseil Supérieur du Cinéma
241 rue Royale [belge
Bruxelles

Film Scolaire
Ministère de l'Education
Luxembourg [Nationale

International Visual Aids Centre
37/39 rue de Linthout
Bruxelles

Ministère des Affaires Economiques et du Tourisme
Luxembourg

B Cercle des géographes liègeois
7 place du XX août
Liège

Fédération belge des Géographes
(Belgische Federatie van Geografen)
35 rue Franklin
Bruxelles 4

Fédération belge des professeurs de géographie
(Belgische Federatie van Leraars in de aarcrijkskunde)
37 rue de Nimy
Mons

Société belge d'Etudes géographiques
(Belgische Vereniging voor Aardrijkundige Studies)
14 rue de l'Université
Gand

C Direction générale des Relations culturelles
155 rue de la Loi
Bruxelles

SWITZERLAND

A Centrale du film scolaire
Erlachstrasse 21
Bern

Publizitätsdienst der Schweizerischen Bundesbahnen
Bern

Schweizerische Arbeitsgemeinschaft für Unterrichts-Kinematographie
Falkenstrasse 14
Zürich 8

B Geographische Gesellschaft
Thunstrasse 36 [Bern
Bern

Société de Géographie de Genève
rue de l'Athénée
Genève

Verein Schweizerischer Geographielehrer
Eichhalde 10
Zürich 7/53

C Zentralstelle für Dokumentation und Auskunft
Regierungsgebäude
St Gall

ITALY, GREECE AND MALTA

A Centro Nazionale
Perissussidi Audiovisivi
Via Santa Sussana 17
Roma

Ministry of National Education
Directorate of Audio-Visual Aids
Athens

B Associazione italiana degli insegnanti di Geografia
Villa Celimontana
12 via della Navicella
Roma

Istituto geografico de Agostini
Novara

Societa di Studi geografici, Firenze
Via Laura 48
Firenze

C Centro didattico nazionale di Studi e Documentazione
Palazzo Gerini
Via Michelangelo Buonarroti
Firenze

Librarian of the Malta Union of Teachers
153 Britannia Street
Valetta, Malta

Touring Club Italiano
Corso Italia 10
Milano

SPAIN AND PORTUGAL

A Cifesa
Avenida de José Antonio 41
Madrid

Producciones Ancora
Mayor de Graca 153–155
Barcelona

Sueva Films
Avenida de José Antonio 66
Madrid

União de Cremios Espectaculos
Avenida Dugue de Loule 86m
Lisboã

B Centro de estudos geograficos
Faculdade de letras
Universidade
Coimbra

Instituto 'Juan Sebastian Elcano'
Departamento de geografiá aplicada
Ciudad Universitaria
Zaragoza

Sociedad de Geografia de Lisboã
100 rua das Portas de Santo Antaõ
Lisboã

Sociedad Geografica nacional
Calle de Valverde 24
Madrid

C Centro de Documentación y Orientación
Didáctica de Enseñanza primaria
Ministerio de Educación Naciónal
Pedro de Valvidia, 38, 2° izqda
Madrid 6

Instituto de Pedagogia
Calle Serrano 127
Madrid

GERMANY AND AUSTRIA

A Bundesministerium für Handel u. Wiederaufbau
Stubenring 1, Wien 1

Bundesministerium für Unterricht Filme für Obligate Schulvorführungen Während der Unterrichtzeit
Minoritenplatz 5, Wien 1

Georg Westermann Verlag
G. Westermann-Allee 66
Braunschweig

Institut für den wissenschaftlichen Film
Nonnenstief 72, Göttingen

Institut für Film und Bild in Wissenschaft und Unterricht
Museumsinsel 1, München 26

Unitas Filmverleih
München Presse und Informationsamt der Bundesregierung
Bonn

B Geographische Geselleschaft der Deutschen Demokratischen Republik
Dimitroff-Platz 1
Leipzig C.1

Gesellschaft für Erdkunde zu Berlin
Grunewaldstrasse 35
Berlin, Steglitz

Österreichische Geographische Gesellschaft
Judenplatz 11
Wien 1

Verband deutscher Schulgeographen
Leinstrasse 1
Hannover

C Pädagogische Dokumentations und Arbeitsstelle
Nassestrasse 11
Bonn

NETHERLANDS AND SCANDINAVIAN COUNTRIES

A AB Kinocentralen
Drottninggatan 47
Stockholm C.

Bokförlaget Natur och Kultur
Torsgatan 31
Stockholm Va.

C. Monsen
Torget 15
Bergen

Europafilm
Kungsgatan 24
Stockholm C.

Landbrusksdepartementets
Billedkontor
Frydenlundsgate 8
Oslo

Nordisk Films Co.
Frederiksberggade 25
København

Norsk Dokumentarifilms
Per Borgersen Tiedemansg. 5
Oslo

Norwegian National Film Board
Schwensensgate 6
Oslo

P.A. Norstedt & Söner A.B.
Box 2052
Stockholm Va.

Pedagogisk Forlag A/S
Kirkegata 5
Oslo

Richter
Vesterbrogade 80
København V

Sol-Film
Klara övre Kyrkogata 12
Stockholm C.

Statens Filmcentral
27 Vestergade
København K.

Stichting Nederlandse
Ondersÿjsfilm
Riomostraat 28
The Hague

Suomen Kansakoulunopettajain
Lönnrotinkatu 25 [Liittoo
Helsinki

Svensk filmindustri
Kungsgatan 36
Stockholm 1

B Bureau Documentatie van het
Ministerie van Onderwijs
Nieuwe Uitleg 1
The Hague

Det Norske Geografiske Selskab
Geografisk Institut
Universiteteti Oslo
Blindern

Geografforeningen
Universitets geografiske Institut
Kejsergade 2
København

Geografische Vereniging in
Nederland
Past. Vranckenlaan 22
Reuver, Limburg

Nederlandse Vereniging voor
Economische en Sociale
Geografie
Pieter de Hoogweg, 122
Rotterdam W.

Suomen Maantieteellinen Seura
Snellmaninkatu 9–11
Helsinki

Svenska Sällskapet för antro-
pologi och geografi
Geografiska Institutet
Drottninggatan 120
Stockholm Va.

C Norsk Skolemuseum
Möllergate 49, Oslo

Statens Paedagogiske Studiesamling
Frederiksberg Allé 32
København

Statens Psykologisk-Pedagogiska Institut
Lidigovagen 2
Stockholm 0

COUNTRIES OF CENTRAL EUROPE

A Central Film Distribution Offices
Narodnittr. 28
Praha 2, Czechoslovakia

Film Polski
56 Marszalkowska
Warszawa, Poland

Yugoslavija-Film
Knez Mihajlova 19/IV
Beograd
Yugoslavia

Direction de la Distribution des Films
rue Julios Fucic no. 25
Bucarest, Romania

Országos Filmhivatal
Kossuth Lajos Tér. 4
Budapest 4, Hungary

Savezni centar za nastavni i kulturno prosvetni film
ul. Mose Pijade 12
Beograd
Yugoslavia

The Barrandov Film Studios
Krizeneckeho nam. 322
Praha, Smichov, Czechoslovakia

The Central Management of Czechoslovakian Films
Jindrisska 34
Praha 2, Czechoslovakia

The Czechoslovak Filmexport
Vaclavske nam. 28
Praha 2, Czechoslovakia

B Bulgarska Academija na naukite
Geografski Institut
Ul Ivan Vazov no. 13
Sofiya, Bulgaria

Comité National de Géographie de la République populaire roumaine
rue Dr Durghete 1
Bucarest 20, Romania

Direction de la Géographie
Ministère de l'Instruction publique
Tirana, Albanie

Geografsko Drustvo Hrvatske
Marulicev Trg 19/11
Zagreb, Yugoslavia

Geografsko Drustvo Slovenije
Université de Ljubljana
Ljubljana, Yugoslavia

Magyar Földrajzi Társaság
Népköztársaság útja 62
Budapest VI, Hungary

Polskie Towarzystwo Geograficzne
Krakowskie Przedmiescie 30
Warszawa, Poland

Polskie Towarzystwo Geograficzne
Plac Uniwersytecki 1
Instytut Geograficzny
Wroclaw, Poland

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Societatea de Stiinte Naturala si Geografie
Boulevard Schitu Magureanu, no. 9
Bucarest, Romania

Srpsko Geografsko Drustvo
Studentski Trg 3
Beograd, Yugoslavia

Statni pedagogické nakladatelstvi
Ostrovni 30
Praha 2, Czechoslovakia

C Ceskoslovenska Spolecnost [Zemepisna
Albertor 6
Praha 2

Dzial Dokumentacji Pedagogicznej
Instytut Pedagogiki
ul. Gorczewska 8
Warszawa, Poland

Institutul de Stiinte Pedagogice
Strada Spiru Haret 8
Raionue Gh. Gheorghiu-Dej.
Bucarest, Romania

Pedagogical Society of the P.R. of Serbia
Nastava i vaspitanje
Terazije 26
Beograd, Yugoslavia

Pedagogiai Tudomanyos Intézet
Szalay-utca 10–14
Budapest V, Hungary

Savezni Zavod za Proucavanje Skolskid i Prosvetnih Pitanja
Decanska 13
Beograd, Yugoslavia

Statni Pedagogicka Knihovna v Praze
Mikulandska 5
Praha 2, Czechoslovakia

SOVIET UNION

A Sovexport Film
Moscow

B Department of Geology and Geography
Academy of the Sciences of the USSR
Lenin Prospekt
Moscow

Vsesojuznoe Geograficeskoie Obscestvo
10, Grivtsova
Leningrad

C Ministerstvo prosveshcheniia R.S.F.S.R.
Uchpedgiz
Chistye prudy 6
Moskva

Museum of Public Education
Chistye Prudy
5/16 Lobkovsky per.
Leningrad

Uchebno-Pedagogicheskoye izdatel'stvo
Ministerstvo prosveshcheniia R.S.F.S.R.
3-J, Proezd Mar'inoj Rosci
41, Moskva

CANADA

II. AMERICA

A Canadian Film Institute
1762 Carling Avenue
Ottawa 3

Educational Film Distributors
47 Dundonald Street [Ltd
Toronto

National Film Board of Canada
3255 Côte de Liesse Road
Montreal 3

B Canadian Association of Geographers
Education Committee
Box 421
Ottawa

Geographical Branch
Dept. of Mines and Technical Surveys
601 Booth Street
Ottawa

Royal Canadian Geographical
54 Park Avenue [Society
Ottawa 4

C Canadian Education Association
206 Huron Street
Toronto 5

UNITED STATES

A Academy Films
800 North Seward Street
Hollywood 38, California

Air World Education
Trans World Airlines
380 Madison Avenue
New York 17, N.Y.

Almanac Films, Inc.
516 Fifth Avenue
New York 18, N.Y.

American Museum of Natural History Film Library
Central Park West at 79th Street
New York 24, N.Y.

Audio-Visual School Service
48 East 29th Street
New York 16, N.Y.

Contemporary Films, Inc.
267 West 25th Street
New York 1, N.Y.

Coronet Films
Coronet Building
Chicago 1, Illinois

Curriculum Films, Inc.
10 East 40th Street
New York 16, N.Y.

Eastern Air Lines
10 Rockefeller Plaza
New York 20, N.Y.

Encyclopaedia Britannica Films,
1150 Wilmette Avenue [Inc.
Wilmette, Illinois

Eye Gate House, Inc.
2716 41st Avenue,
Long Island City 1, New York

Farm Film Foundation
1731 Eye Street, N.W.
Washington 6, D.C.

Films of the Nation Distributors,
62 West 45th Street [Inc.
New York 36, N.Y.

Ford Motor Company
Film Library
3000 Schaefer Road
Dearborn, Michigan

UNITED STATES—*contd.*

Herbert E. Budek Company, [Inc.
324 Union Street
Hackensack, N.J.

Ideal Pictures
233–239 West 42nd Street
New York 36, N.Y.

Indiana University
Audio-Visual Center
Bloomington, Indiana

International Education
Materials Corp.
625 Madison Avenue
New York 22, N.Y.

International Film Foundation
1 East 42nd Street
New York 17, N.Y.

Jam Handy Organization
2821 East Grand Boulevard
Detroit 11, Michigan

John Wiley and Sons
440 Fourth Avenue
New York, N.Y.

Life Magazine
Filmstrip Division
9 Rockefeller Plaza
New York 20, N.Y.

McGraw-Hill Book Company
Text-film Department
330 West 42nd Street
New York 36, N.Y.

Pan American Airways
28–01 Bridge Plaza North
Long Island City, New York

Popular Science Publishing Co.
Audio-Visual Division
353 Fourth Avenue
New York 10, N.Y.

Rand McNally & Co.
P.O. Box 7600
Chicago 80, Illinois

Society for Visual Education, [Inc.
1345 Diversey Parkway
Chicago 14, Illinois

United Air Lines, Inc.
School and College Service
P.O. Box 8800
Chicago 66, Illinois

United World Films, Inc.
1445 Park Avenue
New York 29, N.Y.

Visual Education Service
Yale University
409 Prospect Street
New Haven, Conn.

Young America Films
18 East 41st Street
New York 17, N.Y.

LATIN AMERICA

A Bolivar Films
Caracas, Venezuela

Departmento de Radioseñanza y
Cinematografia Escolar
Ministerio de Educación de la
Nación
Buenos Aires, Argentina

Instituto Nacional de Cinema
Educativo
Ministero de Educacaõ e Saude
Pracada Republica 141A
Rio de Janeiro, Brazil

Kodak Mexicana Ltd
Londres 16
Mexico 6, D.F.

Posa Films
Morelos 110
Mexico, D.F.

Servicias de Difusion Cultural y Cinematografia
Universidad de Chile
San Isidro 65
Santiago de Chile

Universidad Nacional de San Marcos
Facultad de Educación
Departamento de Práctica Profesional y Material Didáctico
Lima, Peru

Instituto de estudios geograficos
Universidad
Tucuman, Argentina

Instituto de geografia
Jose Pedro Alessandri 1027
Casilla 147
Santiago de Chile

Instituto Panamericano de Geografia e Historia
Exarzobispado 29
Mexico 18, D.F.

Sociedad Argentina de Estudios Geograficos GEA
Universidad Nacional de Cuyo
Rivadavia, 544
Mendoza, Argentina

B Associação dos geografos brasileiros
Seçaõ regional de Rio de Janeiro
Av. Beira-Mar. 436
Rio de Janeiro, Brazil

Asociación de Geografos del Uruguay
Constituyente 1711
Montevideo, Uruguay

Asociación nacional de Geografos
Padre Jeronimo no. 450
Lima, Peru

Centro de pesquisas de geografía da Brasil
Avenida Presidente Antonio Carlos, 40
9° andar
Rio de Janeiro, Brazil

Commissão de Geografia
Instituto pan-americano de Geografia e historia
Av. Churchill, 129
Rio de Janeiro, Brazil

C Biblioteca y Museo Pedagogicos
Plaza Cagancha 1175
Montevideo, Uruguay

Centro de Informacion y Documentacion Pedagogicas
Ministerio de Educación
Caracas, Venezuela

Centro de Informacion y Documentacion Pedagogicas
Ministerio de Educación
Quito, Ecuador

Department of Education
University College of the West Indies
Mona, St Andrew
Jamaica

Instituto Nacional de Estudos Pedagogicos
Ministerio do Educação e Cultura
Caixa Postal no. 1669
Rio de Janeiro, D.F.

Instituto Nacional de Pedagogïa
Ignacio Ramirez, 6
Mexico, D.F.

COUNTRIES OF THE FAR EAST

III. ASIA—AFRICA

Japan

A Educational Film Exchange
Asahi Building
No. 3 Ginza Nishi 6-Chome
Tokyo

Gakashu Kenkyusha
264 Kami-ikegami-cho
Ota-ku, Tokyo

Iwanami Eiga Seisakujo
(Iwanami Movie Production Co.)
2–3 Jinbo-cho, Kanda, Chiyoda-
Tokyo [Ku

Mainichi Eiga Co. Ltd
Press 'Mainichi'
11 Yurakucho 1-chome Chiyoda-
Tokyo [ku

Nippon Eiga Shin-Sha Ltd
9 Ginza-Nishi 8-chome Chuo-Ku
Tokyo

Tokyo Slide
Kabushiki Kaisha
4–56 Shinjuku, Shinjuku-ku
Tokyo

B Jimbun Chirl Gakkai
Geographical Institute
Faculty of Literature
Kyoto University, Kyoto

Nippon Chiri Gakkai
Tokyo Daigaku Rigakubu
Chirigaku Kyoshitsu
Motofuji-cho
Bankyo-ku, Tokyo

Nippon Chirikyoiku Gakkai
Tokyo Gakugei
Daigaka Chirigaku Kenkyushitsu
3–35 Shimouma-cho
Setagaya-ku, Tokyo

Osaka Gakugei daigaku chiri
Osaka University
Minami Kawahori-machi
Tennoji-ku, Osaka

Tohoky Daigaku Rika Hokoku
Katahira-cho, Sendai

Tokyu Chigaku Kyokai
12 Niban-cho
Chiyoda-ku, Tokyo

Other countries of the far East

A Audio-Visual Education Institute
33 3Ka Chongro Koo
Seoul, South Korea

Mivo Yang Hang Co.
P.O. Box Cent. 137
Seoul, South Korea

B Chinese Geographical Society
Department of Geography
National Central University
Nanking, China

Department of Geography
College of Education
Seoul National University
Seoul, South Korea

Department of Geography and
Geology
University of Hong Kong
Hong Kong

Geographical Faculty
Pyong-Yang Pedagogical Institute
Pyong-Yang
Northern Rayon, Korea

Geographical Society of China
c/o Department of Geography
Taiwan Normal University
Taipei, Taiwan

National Normal University
Department of Geography
Peking, China

Philippines Geographical Society
Soil Conservation Building
Florida St., Manila, Philippines

C Chung-Ang Kyo-yook Yun-gu
77 Sechong-no [So
Seoul, South Korea

COUNTRIES OF SOUTH AND SOUTH-EAST ASIA

A Ama Educational Films Private
159 Mount Road [Ltd
Madras 2, India

Berita Film Indonesia
Ministry of Education
Djakarta, Indonesia

Department of Films and Publications
Government of Pakistan
Karachi, West Pakistan

Federal Film Library
Oriental Building
Kuala Lumpur, Malaya

Department of Information
Saigon, Viet-Nam

Films Division
Ministry of Information and Broadcasting
68 Tardeo Road
Bombay 7, India

Information Officer
Senate Building
Colombo, Ceylon

The Central Film Library
Audio-Visual Aids Section
Ministry of Education
Government of India
New Delhi, India

The Department of Fine Arts
Ministry of Education
Bangkok, Thailand

The Ministry of Information
Stage and Film Section
Rangoon, Burma

B Association of Indian Geographers
Flat No. 30, New Central Market
P.O. Box 644
New Delhi, India

Association of Malayan Geographers
Department of Geography
University of Malaya
Pantai Valley
Kuala Lumpur, Malaya

Bombay Geographical Associa-
Parle College [tion
Bombay 57, India

Ceylon Geographical Society
Department of Mineralogy
Sri Jinaratana Road
Colombo 2, Ceylon

Department of Geography
Faculty of Letters and Culture
Gadjah Mada University
Jogjakarta, Indonesia

COUNTRIES OF SOUTH AND SOUTH-EAST ASIA—*contd.*

Department of Geography
University of Peshawar
Peshawar, West Pakistan

Department of Geography
University of Rangoon
University P.O.
Rangoon, Burma

East Pakistan Geographical Society
Department of Geography
University of Dacca
Dacca, East Pakistan

Faculty of Arts and Education
Chulalongkorn University
Phya Thai Road
Bangkok, Thailand

Geographical Society of Ceylon
University of Ceylon
Peradeniya, Ceylon

Geographical Society of India
Senate House
Calcutta University
Calcutta 12, India

Indian Geographical Society
University Examination Hall
Marina, Madras 5, India

Muslim University Geographical Society
Department of Geography
Aligarh Muslim University
Aligarh, India

Pakistan Geographical Assocn.
Department of Geography
University of the Panjab
Lahore, Pakistan

Pakistan Institute of Geographers
Karachi 5, Pakistan West

South India Teachers' Union
Raja Annamalaipuram
Madras 28, India

The National Geographical Society of India
Department of Geography
Banaras Hindu University
Varanasi 5, India

C Education Officer
Ministry of Education
Federal House
Kuala Lumpur, Malaya

Information and Publication Unit
Ministry of Education
Government of India
New Delhi, India

COUNTRIES OF THE NEAR AND MIDDLE EAST

A Beit Hasagar Le-Hinnukh
Beit Hakerem
Jerusalem, Israel

Department of Fine Arts
Teheran, Iran

Geva Films Ltd
Tel Aviv, Israel

Ogretici Filmler
Merkezi Yapi Enstitüsü
Ankara, Turkey

Sirtoney Israël
7 rue Prof. Schorr
Tel Aviv, Israel

B Department of Geography
College of Arts and Science
University of Baghdad
Baghdad, Iraq

Department of Geography
Hebrew University
Jerusalem, Israel

Department of Geography
National University of Lebanon
Unesco Building
Beirut, Lebanon

Department of Geography
University of Khartoum
P.O. Box 321
Khartoum, Sudan

Société de Géographie d'Egypte
rue Kasr el-Aini
B.P. Kasr el-Doubara
Cairo, Egypt

Türk Cografya Kurumu
Dil ve Tarih
Cografya Fakültesi
Ankara, Turkey

C Information Centre on Teaching
Unesco, Beirut, Lebanon

Institute of Education
16 Sharia Amin Samy Pasha
Mounira, Cairo, Egypt

Teachers' Training College
University College of Addis
Addis Ababa [Ababa
Ethiopia

OTHER COUNTRIES OF AFRICA

A Film Section
Department of Education, Arts and Sciences
Impala House
Pretoria
Union of South Africa

Ghana Film Unit
Public Relations Department
Accra, Ghana

Information Department
P.O. Box 142
Kampala, Uganda

Nigerian Film Unit
Public Relations Department
11 Custom Street
Lagos, Nigeria

B Department of Geography
University of Stellenbosch
Stellenbosch, Cape Province
Union of South Africa

Ghana Geographical Association
University College of Ghana
Accra, Ghana

South African Geographical
P.O. Box 5013 [Society
Johannesburg
Union of South Africa

The Nigerian Geographical Association
Department of Geography
University College
Ibadan, Nigeria

Uganda Geographical Associa-
Makerere College [tion
P.O. Box 262
Kampala, Uganda

C National Bureau of Educational Research
Department of Education
Private Bag 122
Pretoria, Union of South Africa

Technical College of East Africa
Faculty of Arts
P.O. Box 30 197
Nairobi, Kenya

IV. OCEANIA

A Audio-Visual Aids
Vincent Street
Leederville, W.A., Australia

Director,
News and Information Bureau
Department of Interior
Canberra, A.C.T., Australia

Information Section
New Zealand Tourist and Publicity Department
Wellington, New Zealand

National Film Library
Canberra, A.C.T., Australia

New Zealand National Film Unit
Darlington Road, Miramar
Wellington, New Zealand

The Superintendent
Government Films
8a Mounts Bay Road
Perth, Western Australia

Visual Aids
Twin Street
Adelaide, S.A., Australia

Visual Education Centre
124 Latrobe Street
Melbourne, Victoria, Australia

Visual Education Section
Department of Education
Port Moresby, New Guinea

B Geographical Society of New South Wales
Science House
Gloucester Street
Sydney, New South Wales
Australia

New Zealand Geographical Society
Department of Geography
University of Canterbury
Christchurch C.1, New Zealand

The Institute of Australian Geographers
Department of Geography
University of South Australia
Adelaide, S.A., Australia

C Commonwealth Office of Education
Corner York and Market Streets
Box 3879, G.P.O.
Sydney, N.S.W., Australia

New Zealand Council for Educational Research
Southern Cross Building
22 Brandon Street
Wellington C.1, New Zealand

International statistics

Teachers complain, often rightly, that the up-to-date statistics they need for preparing their lessons and for setting exercises for their classes are not available to them. Though this complaint was formerly justified, it is becoming progressively less so today, particularly as regards world statistics, as a consequence of the issue of the yearbooks and other periodicals of the United Nations. We hope therefore that it will be useful to include a list of the most important periodicals on international statistics. They can be found in the main libraries, in

universities and in the offices of the agents of the various United Nations organizations.

List of the main periodicals devoted to international statistics

PUBLICATIONS OF THE UNITED NATIONS

United Nations. Department of Economic and Social Affairs. Statistical Office. New York.

Commodity Trade Statistics, 1950– . 4 issues a year.
Demographic Yearbook, 1948– . Annual.
Direction of International Trade, 1949– . Monthly.
Economic Survey of Asia and the Far East, 1948– . Annual.
Economic Survey of Latin America, 1948– . Annual.
Economic Survey of Europe, 1948– . Annual.
Monthly Bulletin of Statistics, 1946– .
Statistical Yearbook, 1948– . Annual.
Summary of Recent Economic Developments in the Middle East, 1951– .
World Economic Report, 1948– . Annual.
Yearbook of International Trade Statistics, 1950– . Annual.

Food and Agriculture Organization. Rome.

Monthly Bulletin of Agricultural Economics and Statistics, 1952– .
Unasylva; Review of Forestry and Forest Products, 1947– . 4 issues a year.
Yearbook of Fishery Statistics, 1947– .
Yearbook of Forest Products Statistics, 1947– .

International Labour Office. Geneva.

Yearbook of Labour Statistics, 1940– .

OTHER PUBLICATIONS

Organization for Economic Co-operation and Development. Paris.

Current Statistics. Monthly.
General Statistics, 1951– . 6 issues a year.
Foreign Trade Statistics. 3 series.

The Statesman's Year-Book; statistical and historical annual of the states of the world. Macmillan. London,

Statistisches Bundesamt. Wiesbaden, Germany.
Statistisches Taschenbuch. Annual. In German, French and English.

Conclusion

The sources of documentation we have mentioned, numerous and varied as they are, obviously cannot meet the special needs of every individual teacher. Some will have to seek out for themselves, in their own countries, and in whatever language or languages they know, the works that will best fill their requirements. We hope, however, that we have given them some guidance in their quest by informing them of the periodicals, bibliographies, yearbooks and addresses which will be useful. Teachers should not hesitate to ask their national organizations to assist them in solving their teaching problems. Associations of geography teachers are steadily increasing in number (see the list above). Some of them have permanent secretariats and can thus deal with individual requests from their members. Often they have circulating libraries and they hold congresses and co-operate with university institutions in organizing teachers' symposia and even refresher courses during the academic vacations. It is in the interest of all teachers to join these organizations so that they may have the benefit of the cultural exchanges such contacts permit, both for themselves and for their pupils.

Even the teacher who feels himself utterly isolated is never alone so long as he has basic documentation within reach. The essential thing is to understand what geography is, in its modern sense, and to work to improve his teaching of it. If it is felt that reforms are needed, advantage can obviously be taken of the experience gained in those countries where proven methods are in use, but servile imitation will not be enough and might sometimes even be harmful. It is better to seek for oneself the means most suited to local conditions, that is to say, to the physical and human environment, and to compile the syllabus which is most appropriate to the mental level of the pupils concerned. While it is true that the general principles are universally valid, the application of those principles nevertheless necessitates a choice of procedures and methods that must be made on the spot in an endeavour to meet in an intelligent way the needs of those who have to be taught with the means available.